What's in this issue—

Modernizing freight as well as passenger equipment, railroads are using box cars of **high-tensile, low-alloy steel. Welding is used extensively** in their manufacture. Pullman-Standard's practice in welding these cars is outlined, with pictures, on page 408.

Exact templet work is necessary in making **tools that form the rolled edge of non-circular steel trays. The dies for U-ing and curling** are important too. On page 419 are details of how the job is done.

What is **industry's No. 1 job?** "**Public relations,**" answers Paul Garrett, General Motors public relations chief. He tells you why on page 407.

Automobile plants transport thousands of tons of materials within their various departments daily. That calls for a **highly mechanized system which can move materials quickly and economically.** Pontiac has such a system which is described on page 416.

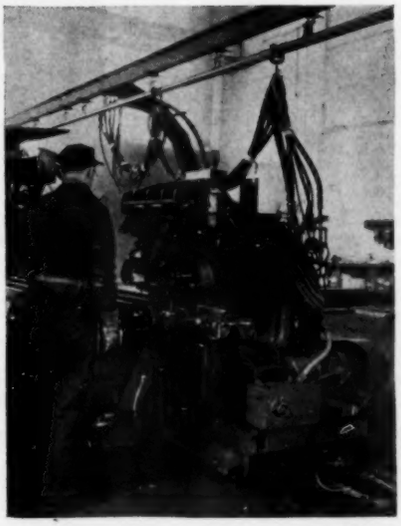
For those who service gears—on page 427 the **recommended viscosities for oils for spur, helical, bevel and herringbone gears.**

Ozzie is a shop menace. He does things the wrong way, injuring himself and endangering fellow-workmen. **For safety's sake** we bring you the picture story on page 414 of a day in Ozzie's life.

Timken had trouble with **grinding wheel spindles, remedied the difficulty by using Graph-mo,** a non-warping, oil-hardening steel originally developed for use in the die industry. The story is on page 422.

Pratt & Whitney Aircraft specify nitrided cylinder barrels for their aircaft engines because of the glass-hard finish which adds to wear resistance. J. Carleton Ward, Jr., assistant general manager, reveals on page 410 details of the **nitriding process** used by the company.

Dad, a worker out in the plant, expounds his homely philosophy on page 413. He points out the **folly of younger employees in thinking that they can get something for nothing.**



Side spot welding machine at Pullman-Standard

Landis Tool Co.'s offices are the last word in comfortable appointments, attractive appearance and efficiency. They are described on page 424 with the aid of pictures and a layout.

Do you dress abrasive wheels in your shop? On page 428 is a description of a **fixture which dresses wheels to special shapes.**

Can a shop operator afford to let his personal feelings influence his business affairs? That's the topic for the round table discussion on page 423. It will be worth your while to take a look at it.

Patents are being issued in considerable numbers in Washington these days. You'll find on page 453 a list of the latest ones pertaining to metal working.

Speeds up to 60 feet per minute are secured on a large vertical-spindle planer-type surface grinder just introduced by a machine builder. It is described on page 431. In fact, **there are 11 pages of new equipment descriptions in this issue.**

If you aren't familiar with the **money-saving shop methods outlined in "Ideas From Practical Men,"** you're missing something. Turn to page 428 and make the acquaintance of that department now. It is a regular feature every issue.

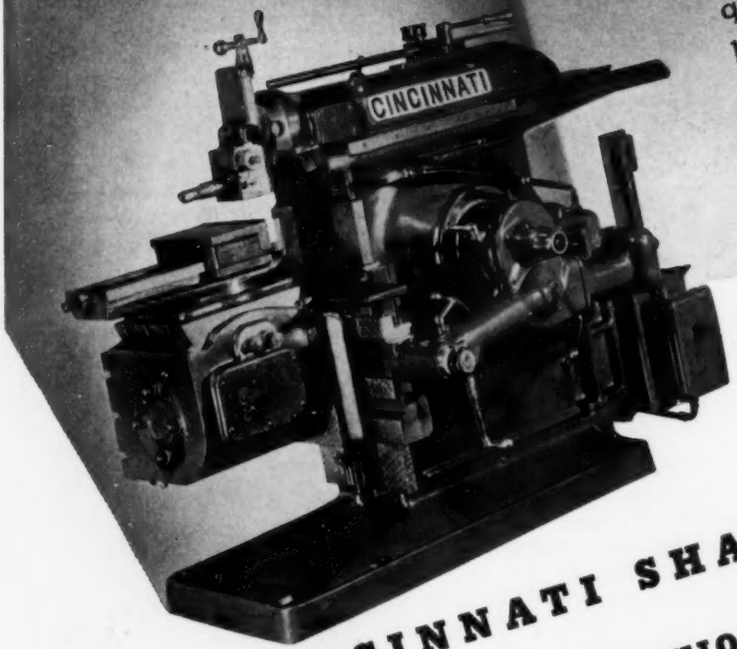
COMING

There will be a lot of good things in the next issue. An account of work at the Watertown arsenal will be a leading feature. Another story will go into the matter of heat-treating costs and how to measure them accurately. A third article will depict the highlights of the new transmission gear plant of Chrysler Corp. at Kokomo, Ind. Still another story will take up the plating of die castings. Altogether, it promises to be a bang-up issue. Don't miss it.

It isn't too early to begin to blow the trumpets for the Annual Modern Plant Number which this year will be devoted to descriptions of the manufacturing methods of the Chevrolet Division of General Motors Corp. It is due on June 29. A corps of editors has been busy the past three months preparing the story of Chevrolet's far-flung operations.

Die cast auto parts after plating

USABLE SPEED



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ESTABLISHED 1877

F. H. COLVIN • K. H. CONDIT • BURNHAM FINNEY, Editors

One Dam Too Many

IF ONE FELT in the mood he could construct a brilliant editorial fantasy upon the theme that our federal government has damned business for so long that it has finally succeeded in damming business. But, fantastic as the antics of the administration have been, the situation is far too grave to encourage such an attitude.

As a constructor of dams Franklin D. Roosevelt will rank with the greatest of them all. Grand Coulee, Fort Peck, Norris, Wheeler, Bonneville and the smaller ones—all of them engineering achievements of the first magnitude—have come into being during his term of office. How many of them are or may be economically justified remains to be seen. In each case only a relatively restricted area of the country is affected.

But the most important dam of all, because it affects the whole country, and is beginning to have international effects as well, is the dam that is effectively blocking business. We are willing to concede that the administration had no intention of building this particular dam, in an election year, and that it is worried about it. At the same time we do not believe that the administration is willing to admit all of the fundamental errors that led to the stoppage of business and to correct them. Don't forget that the White House used every bit of its power to save the undistributed earnings tax principle.

Congress has done a good job in bringing the strangling tax laws somewhere near the limits of reason and equity. Fiscal authorities have desterilized the gold fund that was thought to be bringing runaway inflation upon us, and have lowered reserve requirements. A major effort is under way to stimulate building.

All of these moves are in the right direction but the effect they have produced is not noticeable. The little weekly newspaper which serves our suburb reports no new building contracts since January 1, a new low record. Money is easy and the banks are eager to lend it, but borrowers are scarce. The R.F.C. is making a vigorous effort to encourage commercial loans, on long time, too.

MORE AND MORE the idea is spreading that the government attitude toward labor, as represented by the Wagner Labor Relations Act and the Board that is administering it, is one of the major obstacles in the path of business recovery. Bad as the Act is, its administration has been worse. Even the administrators appear to recognize that fact as shown by the sudden moves to withdraw two important actions after a federal court decision in a parallel case where so-called administrative law was under fire.

Amending or repealing the Wagner Act will not cure the trouble, although it would help considerably. The only way to dynamite this government dam that is blocking business is to stop damning business and business men.

Gaging Business

BUSINESS indicators in the metal-working industries have mostly pointed downward the past two weeks. April machine tool orders, based on the index of the National Machine Tool Builders' Association, were at 90.3 compared with 107 in March. Half of the volume came from foreign buyers. The national steel operating rate is 30.7%, with many large users practically out of the market for the next 30 days or longer. Automobile makers face the prospect of a prolonged shutdown this summer. Total car output for the year won't be much more than 2,100,000 units unless an unexpected spurt occurs.

Farm equipment and tractor production is tapering seasonally. Railroad equipment buying still is at low ebb; orders for Diesel electric locomotives have declined sharply. On the favorable side, the airplane industry continues to boom, companies selling oil field equipment have done fairly well and machinery export inquiries are promising. Metal-working machinery builders have outstanding quotations on $15,000,000 of business for Russian delivery alone. Engineering construction awards are maintaining a lead over the volume in 1937. Business Week's index of business activity stands at 58.2 against 57.9 the previous week.

NEW YORK—Machinery sales are a little better with orders widely scattered. Important inquiries for equipment have come from airplane builders. Export business is still active. France may soon buy equipment for armament production, while England may resume important purchases in this country.

PHILADELPHIA—A few railroad orders for machinery were placed last week and a considerable amount of government business is in the offing.

NEW ENGLAND—Machinery dealers report more inquiries. Fractional horsepower motor sales for machine tool use are better. Boston Navy Yard has announced a $2,000,000 shop expansion program mostly for its structural plant. Makers of handling equipment are working on promising new developments. Industrial conditions generally continue poor, with labor trouble in textiles.

PITTSBURGH—Steel operations in this district are staying around 26% with no likelihood of an immediate upturn. Industrial production, as measured by the Bureau of Business Research of University of Pittsburgh, is at 53.8 compared with 57.4 a month ago. Inquiries for new equipment are in fair volume.

INDIANAPOLIS—Metal - working plants are running on reduced schedules with no improvement in sight. Companies selling equipment in the oil fields are reported doing fairly well. International Harvester again delays completing installation for making truck engines at new plant.

CLEVELAND—Machine tool purchases this month probably won't run over 60% of the April volume. Domestic buyers are hesitant, and except for two or three important inquiries, export demand is slowing down. Steel production is only around 20% and is dependent on small releases from miscellaneous fabricators. Auto parts companies are doing little.

DETROIT—Equipment orders are scarce, with Ford about the only automobile maker in the market. Sales of small tools and supplies are on a hand-to-mouth basis. Toledo parts makers are at low ebb.

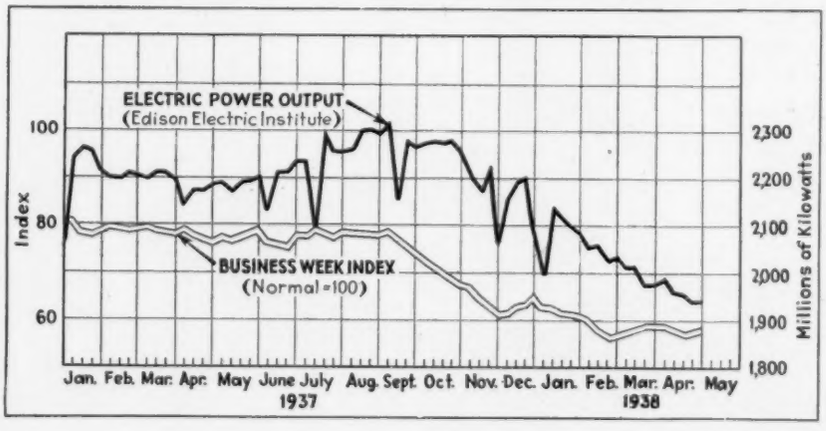
CINCINNATI—Though a few sizable orders have been placed, machinery builders declare domestic business is slim. The foreign market, on the other hand, is still active, the Russians being the biggest buyers recently. Dayton, Ohio auto parts makers are down to two days a week.

CHICAGO—Business appears to be settling down to stay at the current low level indefinitely. There is no regularity of operations in many lines, a bad period of four or five days being succeeded by a good period of several days' duration. Steel purchases by automobile companies and by railroads are near zero, and orders from farm implement makers are sliding off seasonally. Because of reduced vegetable and fruit packs this year the seasonal improvement in tin plate has not been up to expectations. Tin mills are running at 45-50%. Montgomery-Ward's April sales were 20% better than March's and only 8% below April, 1937.

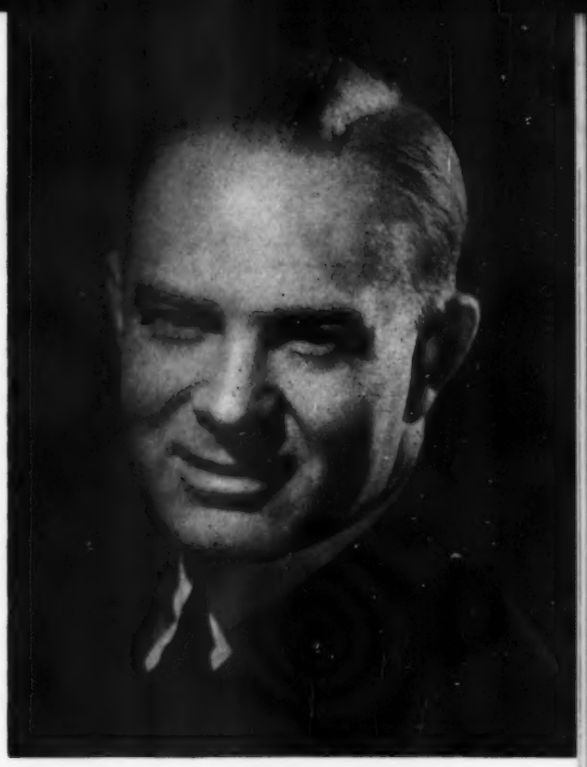
PACIFIC COAST—Five large airplane builders report business 118% ahead of last year. Building construction is increasing steadily and by summer may exceed the rate for the summer of 1937. Lumber and petroleum industries have perked up slightly, but mining operations are way off or at a standstill.

ELECTRIC POWER OUTPUT VS. GENERAL BUSINESS

Steady downward declines in consumption of electricity and the state of general business go hand in hand. News from the heavy industries and automotive centers does not yet indicate an upturn



Public Relations—Industry's No. 1 Job



PAUL W. GARRETT
Director of Public Relations, General Motors Corporation

IF THE AMERICAN business system is to preserve the right to continue its contributions to the general welfare, it must learn to interpret itself in deeds and in words that have meaning to others than itself. For it is not what industry can do for itself that matters. Industry's destiny rests and must necessarily rest not on the system's benefits to capital, not on its benefits to labor, but in the final analysis on its benefits to that most important group that is the common denominator of all—the consumer, the group that outnumbers and includes all others.

And are we not a little shortsighted nowadays to explore so many questions with thought for almost every class except the consumer? The employee's side we headline. The employer's side we expound. These two servants of industry we try daily before our political tribunals in heated arguments. But rarely do we present the case for sober trial in terms that have consumer meaning before the supreme court of public opinion.

We have been generally alert in building a profit motive system that has brought to the American consumer the highest standard of living in the history of mankind. We have been inexcusably stupid in our failure to give him an understanding of how it is that consumer dreams and desires become realities under our system of large scale enterprise. We have made no appreciable effort even to explain the A B C's—the simple premises and processes—of the American plan; to explain that the standard of living for all goes up, and can only be made to go up, as the true price of goods for all is brought down.

And until this elementary concept is got across, how can we expect people to understand that their advanced standard of living—far beyond anything else in the world—is inextricably linked to the characteristic American plan of mass production in industry by which managements are forever striving to drive costs lower and lower to make more and more goods for more and more people? Were this principle understood people would have infinitely greater faith in their own security. They would see that hope ahead lies not in surrendering this basic formula but in making it work better, and making people understand it better. They would recall with understanding that the high living standard that was enjoyed a hundred years ago by scarcely a tenth of our people is now the common possession of two-thirds. They would envision the time perhaps a half century away when, under a continued application of this same formula, poverty might become practically eliminated or reduced to a point where only a tenth of our people would be lacking a satisfying supply of the comforts of life. They would see plainly enough why industrial workers seldom migrate from, but always toward, lands of opportunity.

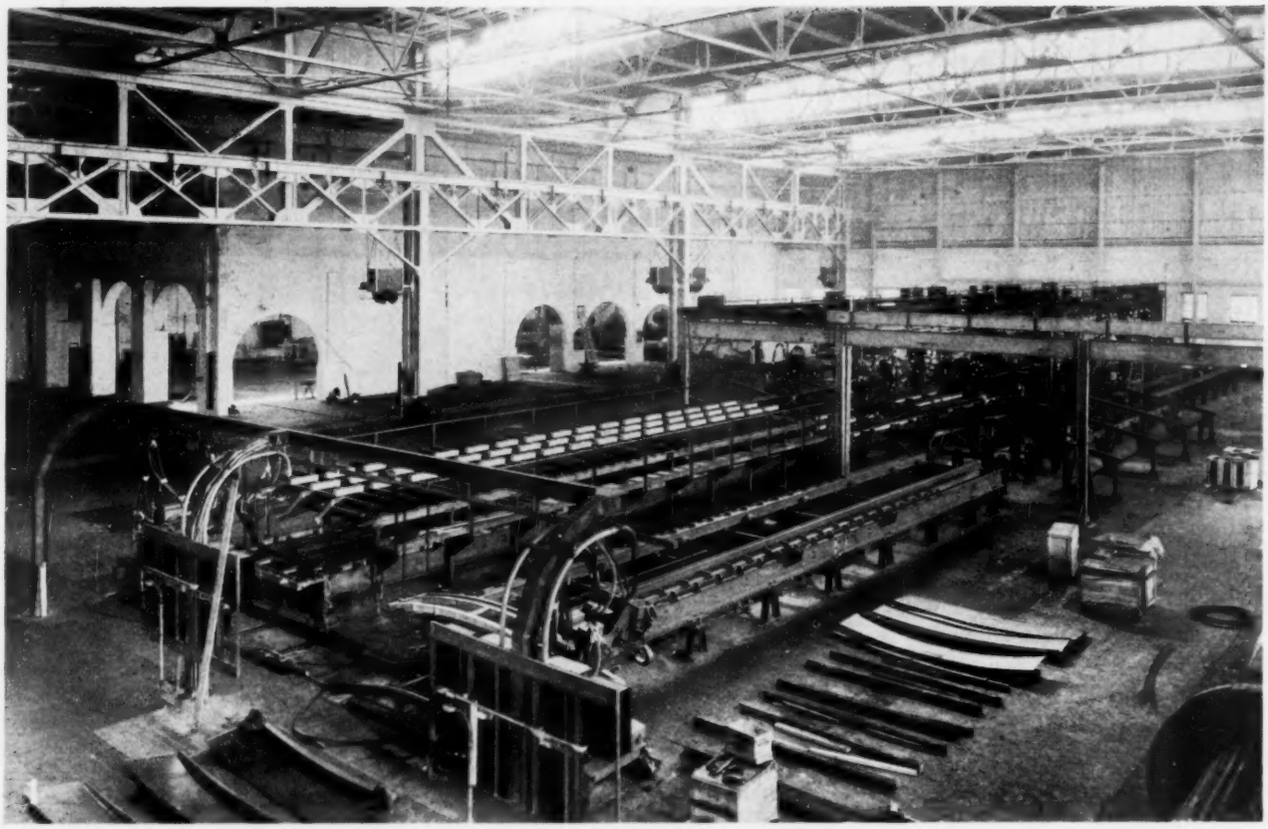
Because so many have not had this understanding, have been viewing themselves as employers, or workers, or farmers—rather than as consumers of goods—they have allowed their narrower outlook almost to blind them, and have put under scourge the source of their broader opportunities. Unknowingly, they have put business on the spot.

Thrust by this turn of events into an awkward and unaccustomed place, conscious of past omissions and critical future needs, industry has been fervently taking stock of itself and submitting to frank, and frequently brutal, self-examination. It has conducted a searching inquiry into the validity of its established principles and accepted doctrines. Out of that inquiry has come a great new interest in what we refer to as human, or public, relations as applied to business. For industry, like democracy, depends for its present success and its future existence upon people, upon those who partake of its responsibilities and its benefits—upon men and women—upon customers.

Public relations, therefore, is not something that can be applied to a particular phase of a business—nor is it an umbrella covering everything but touching nothing. It is rather a fundamental attitude of mind—a philosophy of management—which deliberately and with enlightened selfishness places the broad interest of the customer first in every decision affecting the operation of the business. The philosophy of public relations turns not upon the needs of industry but upon the needs of the customer. Upon what better ground could industry stand?

From an address delivered before the 21st Annual Convention of the American Association of Advertising Agencies.

WELDING CUTS BOX-CAR WEIGHT



1. The jig in the foreground is used for the roof section. The first two preformed sheets are placed on the table and clamped under the welding machine which travels transversely across the sheet. When the first seam has been completed, the sheets are moved along the table by roller chain conveyor, and the next preformed sheet is put in place and welded. When the roof is completed it moves to the A-shaped frame shown in the background. The left-hand jig is used for assembly of the side panels and operates similarly to the one for the roof. The present installation is capable of turning out 25 to 30 cars a day

PULLMAN-STANDARD Car Manufacturing Company has spent ten years experimenting in lightweight cars which will cut railway costs by reducing the waste of hauling dead weight. Within the past few weeks the company has completed its arrangements for the production of lightweight welded steel box cars at its Michigan City plant.

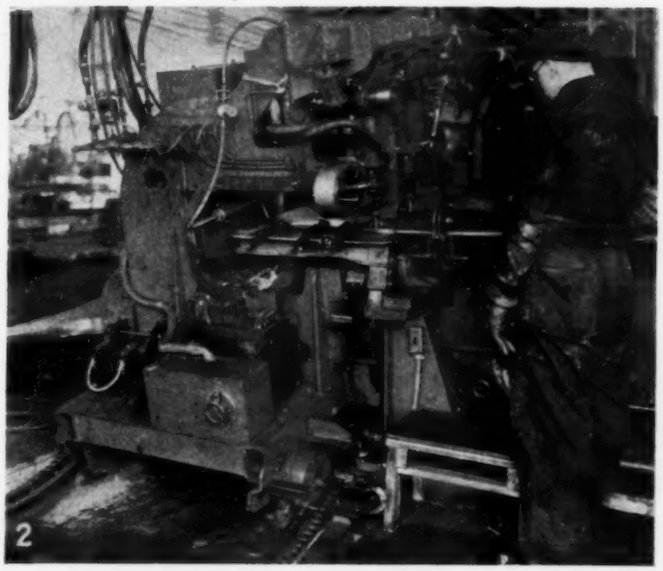
Through its development work Pullman has produced, by the use of welding and high-tensile, low-alloy steels, freight cars which are lighter per pound of pay load carried than those previously built. The company began the construction of five hopper cars in 1930, using electric arc and gas welding in about equal amounts. Savings in weight through the use of thinner sheets, lighter shapes and welding was some 7,000 lb. In 1935 a 50-ton steel sheathed box car was built using newer high tensile steels with better corrosion-resisting properties. Savings in weight on that car approximated five tons over the standard A.A.R. 1934 car.

New Methods Tried

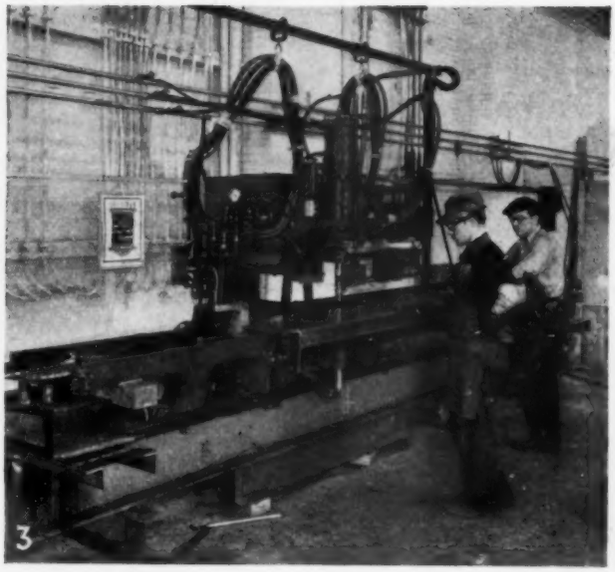
In 1937 a refrigerator car was built with a saving of from 10,000 to 13,000 lb. over cars of similar capacity. Experience on these cars indicated the necessity for the development of spot welding equipment which was thoroughly reliable and fast. In May 1937 experimental equipment was set up and a sample car built to try out fabrication methods. Based on this work Pullman established the present production arrangement and is now in the process of turning out 200 box cars.

Using the electronic principle of timing, spot welding machines are prepared to give a welding time of six to forty-five cycles depending upon the thickness and character of materials. The average used in this shop is about ten cycles. The welders operate with a primary voltage of 480 at 60 cycles which is transformed to welding current of 14 volts with 5000 to 6000 amps. Pressures of 700 to 4000 lb. are used depending upon the thickness of the material, the average being about 1200 lb.

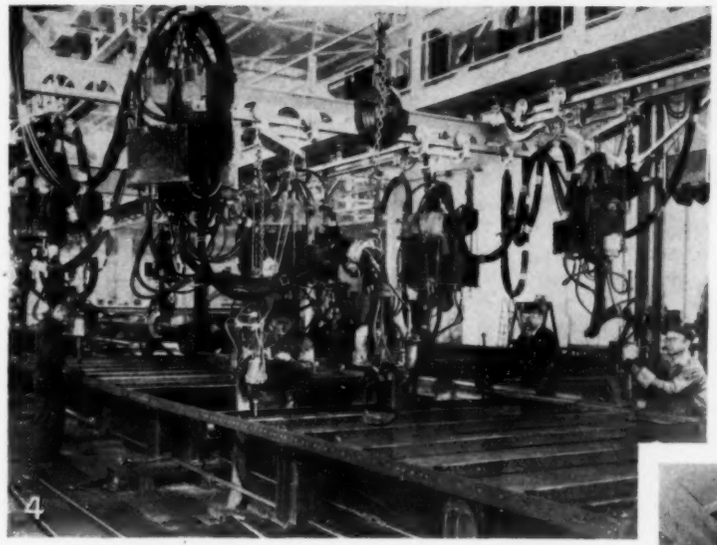
Pullman has established a plan of close supervision, continued inspection and daily testing of welds which is carried on at all times to insure good welding. A test spot weld section is made on each machine every day to insure correct timing, temperature and other factors. In addition, inspectors sound each button on every bench assembly to guarantee a continued perfect quality of weld.



2. The roof spot welding machine moves along the seams making two rows of staggered spots. Spots are produced by the two electrodes which can be seen on either side of the roller which holds the plates together. The electrodes contact the sheet alternately by a "walking beam" arrangement. Roof sheets are 0.05 in. thick high-tensile, low-alloy steel with a Z car line pressed integral and reinforced with 0.05-in. pressed angles spot welded to each car line. Conveyor track, laid on the same radius as the roof sheet, simplifies welding machine operation

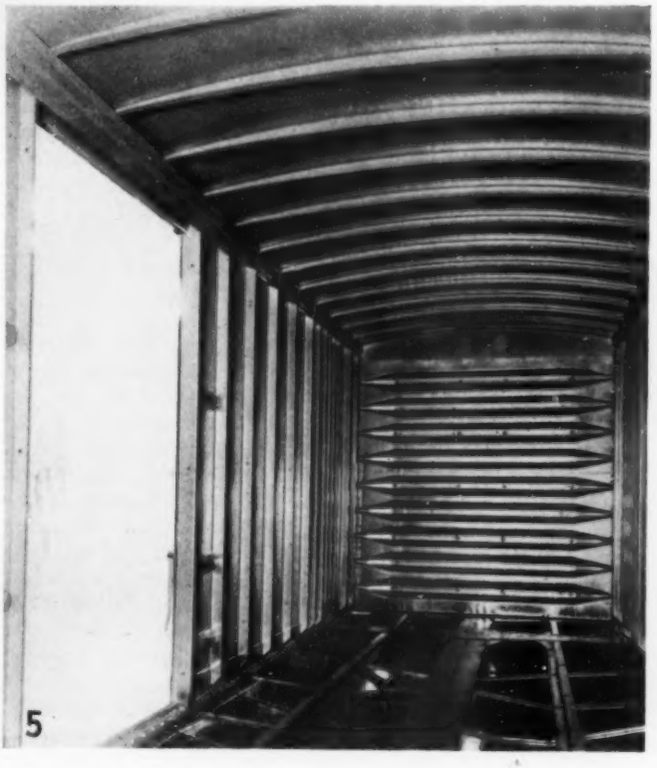


3. Before going to the side assembly, posts are welded to the sides in this machine. Other miscellaneous side parts, such as end sill assembly, side-post reinforcement assembly and others are welded in 50-kva. stationary spot welders with special jigs. Most of the material welded here is 0.05 in. thick, high-tensile, low-alloy steel. In spot welding the side posts the machine travels on roller chain track while side sheets are clamped in stationary jig. In welding miscellaneous side parts a simple wood jig supports the sheets at proper height



4. After the side leave the welding jig similar to that for the roof it rolls to this frame where it is supported while the side sills, side post connections and gussets are attached. Portable welders used here are of 75-kva. capacity. Other portables are used to weld the roof to the side assembly

5. The under-frame of the car is fabricated by arc welding with coated electrodes, the type and size of rod depending upon size of weld and kind of material. Jigs for arc welding are all constructed to permit as much flat welding as possible. Although this car weighs 8900 lb. less than A.A.R. standard, the stresses in proportion to the yield point are in general lower. Final attachment of the end to the car along the corner post seam and attachment of the sides to the under-frame along the side sills is by riveting. Total length of seam for each type of fastening is 1,030 ft. by arc welding, 2,601 ft. by spot welding, 90 ft. by riveting



Hard Bores For Easier Flights

Nitrided cylinder barrels give P. & W. aircraft engines a glass-hard finish that adds to their resistance to wear

J. CARLTON WARD, JR.
Assistant General Manager
Pratt and Whitney Aircraft Division
United Aircraft Corporation

NITRIDING finds a place in aircraft engine manufacture because of the extreme surface hardness it gives to steel with a minimum of distortion. Both these characteristics are desirable in a product that must be held within close working tolerances and at the same time have a stubborn resistance to wear.

The Pratt & Whitney Aircraft Division has been using nitriding for ten months on cylinder barrels, knuckle pins, clutch plates and certain gears. It has installed an entirely new department for this work and has developed a control of the process particularly applicable to its exacting requirements.

Hardened Selectivity

Since cylinder barrels form the larger part of the nitrided work, chief consideration will be given to them. As with most nitrided parts, they must be hardened selectively. The bore, or wearing surface, receives the full treatment while the outside is inhibited during the process by means of a layer of tin plate so that it may be machined later.

For tin plating, the following cycle is used:

1. Cleaned in soda tank; 2. A cold rinse; 3. An acid dip; 4. A cold rinse; 5. Tin plated in two separate tanks; 6. A cold rinse; 7. A hot rinse.

All tanks releasing fumes or steam are equipped with flush-type exhaust hoods which draw off the vapors at the surface and exhaust them through ducts in the floor.

A well planned arrangement keeps all services such as air, steam, water, oil, electricity and exhaust ducts under the floor in tunnels leaving the overhead space free for light and material handling.

In the ordinary type of tunnel construction, this arrangement is often a catch-all for dirt and drainage. This defect is avoided here, however, by putting the service tunnel above a curb a few inches higher than the floor level. Below the curb is a drainage tunnel which permits the floor to be flushed down without any of the dirt or drainage running into the service tunnel.

On the other hand, all auxiliary equipment such as ammonia tanks, motors, generators and panels not required on the operating floor, are located on a special balcony where they are accessible for servicing when need be.

Thickness of Tin

Careful tinning is essential to give a uniform plate that will prevent hard spots in the protected surface. The covering cannot be too thick, because the nitriding process carries the work above the melting point of tin and will cause a heavy plating to flow and drip onto the pieces stacked below. If the tin gets into the cylinder bore of any of the pieces, it will cause soft spots that will result in rejection of the work. If the plate is too thin, it will not inhibit the nitriding action sufficiently and will cause hard spots on the surfaces intended to remain machinable.

After tinning, the barrels are ground at the ends and in the bores. The sharp corners must be rounded slightly to prevent concentrated nitriding or brittleness at this point. The removal of tin leaves only the outside diameter protected by a layer of tin with the bore free of tin for hardening.

Special care is exercised in handling the barrels to prevent their becoming oily or dirty. Electric truck platforms have been designed to handle the pallet with wooden buttons over which the barrels are placed; one pallet may be stacked above the other, and since each carries 24 barrels, a sizable load may be handled with each piece separated from the others.

Degreased by Vapor

The cylinder barrels go to a vapor degreaser after grinding and are carefully wiped inside with a dry cloth. The degreaser is sunk in a pit to make floor level operation convenient with ease of handling the parts.

The nitriding equipment consists of two Westinghouse bell-type electric furnaces each of which is provided with two loading stations. This arrangement makes it possible to use the furnaces continually, one platform being loaded while the other is operating under the bell; thus, the furnace proper is operating continuously.

The barrels are stacked in the loading position by staggering each layer with the one beneath it. Wire trays are placed between each two layers and may be used to support smaller parts in the same heat. With each batch of the work, a test piece of 2½ in. long is placed. About 175 barrels

constitute an average load. A power fan in the base circulates the gas throughout the heating cycle.

The nitriding cycle takes approximately 48 hr.; six to eight hours are consumed in bringing the work up to 975 F., at which temperature it is held for 34 hr. and about seven hours in cooling it to room temperature. Ammonia is supplied from one of four tanks located under the mezzanine gallery above the operating floor near each furnace. A careful record is kept of the rate of flow from each tank so that it can be quickly cut out when exhausted. A small meter records the flow of the gas entering the furnace.

The disassociation of ammonia is controlled by the flow of gas and the amount of the charge in the furnace. A chart has been plotted giving the flow in cu. ft. per min. against the nitrided area. Since this area is about 1 sq. ft. for a small barrel, 1⅛ for the medium size, and 1⅓ for the large size, the total area may quickly be estimated. Disassociation is held between 25 and 30 per cent.

The electric heat is set at the desired temperature with an indicator and is held automatically. This is the heat of the elements in the bell and is checked by two thermocouples within the charge—a short one at the lower end and a long one extending through the center of the work. The temperature of both couples is recorded periodically, and automatically recorded on charts kept for each heat.

When the cycle is completed, the test piece is removed and taper ground at an angle so that each ⅛ in. along its surface represents 0.001 in. of depth. By testing the hardness in a Vickers machine at these ⅛-in. intervals, the depth and degree of penetration is indicated. The work itself is inspected in a "Superficial Rockwell" machine. The depth of case runs from 0.018 to 0.020 in.

The steel used for cylinder barrels is designated as PWA 139 and has an average composition of C-0.41, Mn-0.67, Cr-1.57, Al-0.97 and Mo-0.39. For knuckle pins and gears, a tough core is desired in addition to a hard surface and this characteristic is obtained by the addition of nickel. This steel is designated as PWA 249 and analyses as follows: C-0.25, Mn-0.55, Cr-1.11, Al-1.30, Ni-3.54 and Mo-0.30.

The core of PWA 249 shows the following improvement in physical properties during nitriding:

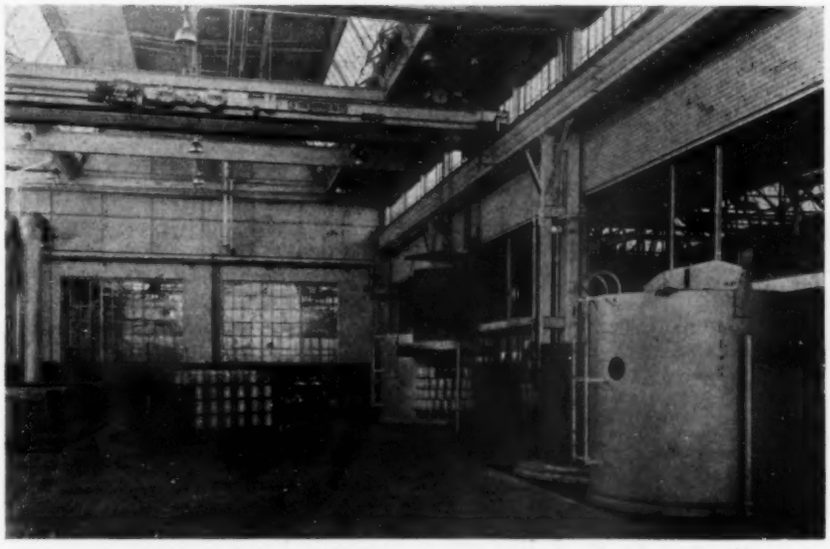
	Before Nitrating	*After Nitrating*
Yield Point	137,500	186,250
Tensile Strength	152,750	194,875
Elongation	18%	16%
Reduction of Area	58.1%	43.5%
Brinnell	305	397

Thus, it will be seen that an attempt has been made to provide in the form of buildings and equipment special facilities for the highly technical requirements of nitriding large volumes of cylinder barrels and other parts entering into airplane engine production. It is felt that the following objects have been attained in this installation:

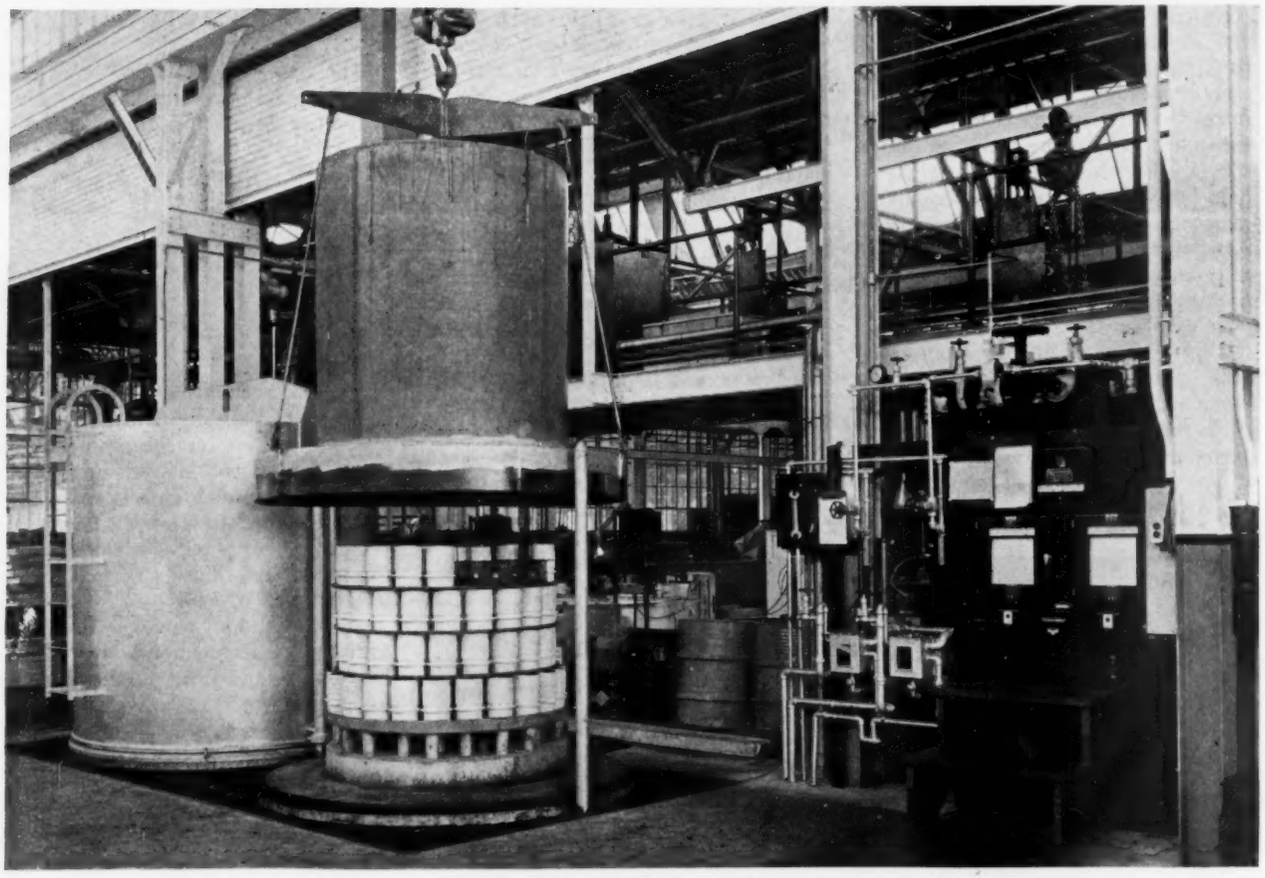
1. A minimum cost of work handling, as evidenced by the method of handling to and from the department on an electric truck, with specially designed work handling devices which protect the parts in transit from damage by nicks as well as dirt or grease. Within the department, an overhead electric crane is used for dipping in the various plating and rinsing tanks and for moving the furnaces from one station to another. The degreasing unit is sunk in a pit so that it may be operated conveniently from floor level.

2. The department has been kept clear of all auxiliary apparatus not required for handling the work. Thus, the plating generators, the automatic control switching, the ammonia tanks, and all like apparatus have been located on a special mezzanine bal-

Of the eight tanks used in the tinning cycle, those emitting fumes or steam are provided with surface-flush exhaust hoods



Traveling cranes handle the bell-type hoods, while cylinders are carried to the loading position on electric trucks equipped with special pallets



Furnace control instruments are placed convenient to the operating position but auxiliary equipment is kept out of the way on a near-by balcony

cony, leaving the flood entirely clear for the work itself, the furnace stations and the chemical baths.

3. Since the operation requires the highest order of technical control, all of the necessary operating instruments are located adjacent to the furnaces both for control of temperatures with their time cycles and for the control of the furnace atmosphere. The floor has been designed to flush off with a hose and it will be noted that the plating and chemical tanks are entirely free from overhead hoods, projecting bus bars, and piping connections, all of which come up conveniently from a floor duct which in turn is so constructed that floor dirt and drainage is not free to enter the duct.

4. Excellent lighting and ventilation is provided by the glass monitor construction since all of the walls of the department are surrounded by the main manufacturing buildings.

Where Limits Stop

The World War called into service many white collar workers who, with limited experience and inadequate supervision, wrought havoc with both the fortunes of fellow workers and our country.

A draftsman of limited practicable knowledge was given the task of designing inspection gages. These gages were to be used in the manufacture of cannon desperately needed at the front, and which were not available because of our usual lack of preparedness.

This designer played safe with his tolerances, appending a long cavalcade of figures behind the decimal point. When dividing a simple decimal figure to lay down radii, this man carried the balance to the fourth and fifth place. This was to become especially costly, since the original cannon drawings from which the gages were patterned were self indicative as to tolerance requirements. Thus, a cannon part requiring no finer limits than 0.01 in. had only two figures behind the decimal point.

Accordingly, a radius only fitting the air but designated as 0.1875 in. on the gage drawings required extra care and was laboriously lapped to within 0.0005 in. A gage manufacturing concern was given the contract to produce the gages which were to be furnished a private contractor. This manufacturing program ran up tremendous costs and when the war suddenly ended, the gages were still uncompleted.

The Department of Justice agents silently began to trace the private life of the inspector in charge. Obviously, from their point of view, this government employee was in collusion with the private gage manufacturer, stretching out the cost-plus-contract and splitting proceeds with the gage contractor.

The government inspector was perfectly honest. Being a top-notch toolmaker he had been selected out of hundreds for this position. Following his training of many years he had, at the gage plant, simply complied with the drawings as required.

He was recalled to headquarters, labelled a traitor to his country by the officer in charge, and discharged after fourteen years of faithful service, a sacrifice to another's inexperience.

DAD SAYS

Kids Have To Learn That You Can't Get Something For Nothing

I ALWAYS enjoy listening to Sailor Sam because he's been about every place in the world. He was telling us the other noon about the Chinese. Seems over there you don't amount to much until you're very old. Anyone under fifty goes around apologizing for being so young. Of course I agree with them. Maybe it's because I wouldn't have to be apologizing in China, but that's not the only reason. After seeing what a mess these youngsters are making of things around here, I can't see why we have to go to China to find out that the kids would be a lot better off if they listened to the older fellows with experience.

When business started to pick up they began hiring in some of these youngsters. Most of them couldn't get a job before, so they just kept going to school or loafed around town, I guess. They came right in on the line and soon were getting the top rate and were making more money in a day than they had ever made in a month, and I guess they got to thinking that money just grew.

About that same time these union disorganizers started coming around and began telling these kids they were working too hard and not getting enough pay for what they did. Now that's where being just kids with too much education and no experience was bad for them. Of course they didn't know how much better jobs were today than they used to be because they never had another job. And you couldn't expect them to figure out that the company couldn't pay more to build their stuff than they could sell it for, so they just swallowed all this union talk and didn't miss the two dollars a month for the union fellow because they didn't have a wife or kids to look after.

Well, it wasn't long before they acted as if they were the ones that owned the business; started telling everyone what they could do and couldn't do. Of course we older fellows who could see no good coming out of all this were just laughed at and called scabs, company stools and all that stuff. We couldn't do any more about it than the bosses did.

Now look where we are. It got to costing so much to build the stuff that no one would buy it. Now most of these kids are back loafing and us older fellows are only working two or three days a week. You'd think they could understand it all now, but it'll probably take these kids a long time to learn that they can't get something for nothing.

For Safety's Sake

Excerpts from a slide film posed

By courtesy of The Travelers Insurance

Don't push a loaded truck. Pull it so that you can see where you're going

Don't oil rotating shafting or pulleys from an unsteady ladder

Don't pile up boxes to enable you to reach jobs along the ceiling

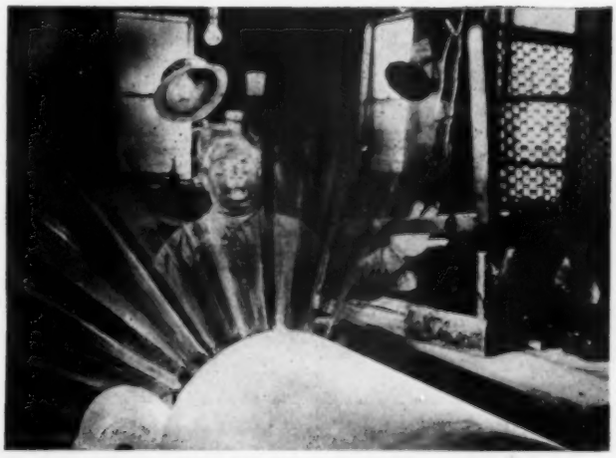
Don't Be an "Ozzie"

by "Ozzie", a typical shop menace

Company and Vocafilm Corporation

Don't oil machinery in motion, particularly while the guards are off

Don't fool with air tools or point them at any one. They are usually loaded



Don't throw oily waste or sweepings into an open fire

Mechanized Handling at Pontiac

Internal transportation system capable of handling thousands of tons of material daily handles parts and materials without delay

ONE OF THE major manufacturing jobs at Pontiac Motors is the handling materials. Raw materials, semi-finished parts and stock, finished parts and supplies arrive daily from outside suppliers. These must be unloaded and delivered to the proper departments or to stock rooms from which they can be withdrawn as production requires.

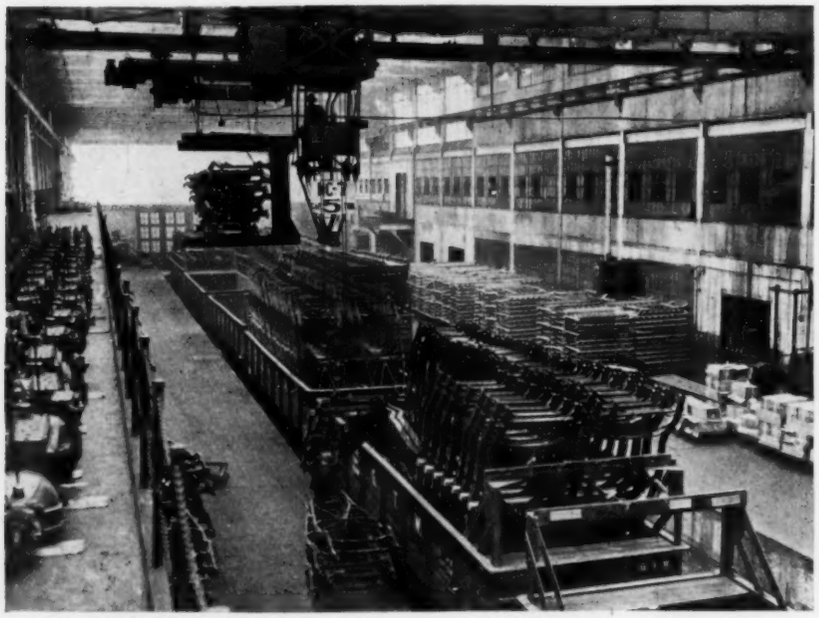
Then, too, there is the task of conveying materials and parts from one operation to another during the manufacturing process, as well as to and from the various assembly lines which, in themselves, are conveyors. All materials and parts must be moved from one part of the plant to another several times before the finished car comes off the assembly line. Therefore, their efficient handling is an effective means of keeping production costs of the modern motor car down within reach of the average buyer.

Back Breaks Banished

If the 380,000 tons of material that went into the 236,000 Pontiac cars that were built last year had been moved by hand probably it would have required almost as many unskilled laborers as were needed to build the Pyramids in the ancient days of the Pharoahs. No doubt the work, too, would have been of the same back-breaking nature. Furthermore, it is doubtful whether any car could have been built to sell at present-day prices under such conditions because the cost and the delays of doing it in that old-fashioned way would have been prohibitive.

Mechanical conveyors now are employed in almost every modern plant. However, the claim is made that in the matter of overhead conveyors there probably is no other plant in the industry which handles as large a volume of materials and parts with as small an installation of this type of conveyor equipment as Pontiac. Such economical operation with respect to conveyors was made possible by the careful attention that was given to layout at the time the plant was built ten years ago.

Although a relatively small amount of conveyor footage and comparatively few industrial trucks are required, nevertheless an inventory of these facilities runs into impressive figures. There are 99 power-driven industrial trucks, more than 36,000 ft. of conveyors and thirteen overhead cranes.



Special cradle for handling chassis frames slips under piles of frames that have been unloaded on the dock beside the gondola cars. Two 5-ton overhead cranes work in this bay

Handling Is Scheduled

Maintenance of this equipment comes directly under the plant engineer, while their operation is a function of the Materials Department. Here a clerical staff working in conjunction with the purchasing department schedules the handling of all incoming materials. However, inter-department trucking and conveying of parts and materials in process of manufacture is supervised by a group of material supervisors.

Parts that are of a size and shape to make it economical are handled on overhead conveyors from one department or from one plant to another. Although finished motors weigh hundreds of pounds each they

All incoming freight cars are unloaded indoors so that weather conditions will not hamper material handling operations. More than 380,000 tons of material was moved through the Pontiac plant last year by trucks, cranes and conveyor lines

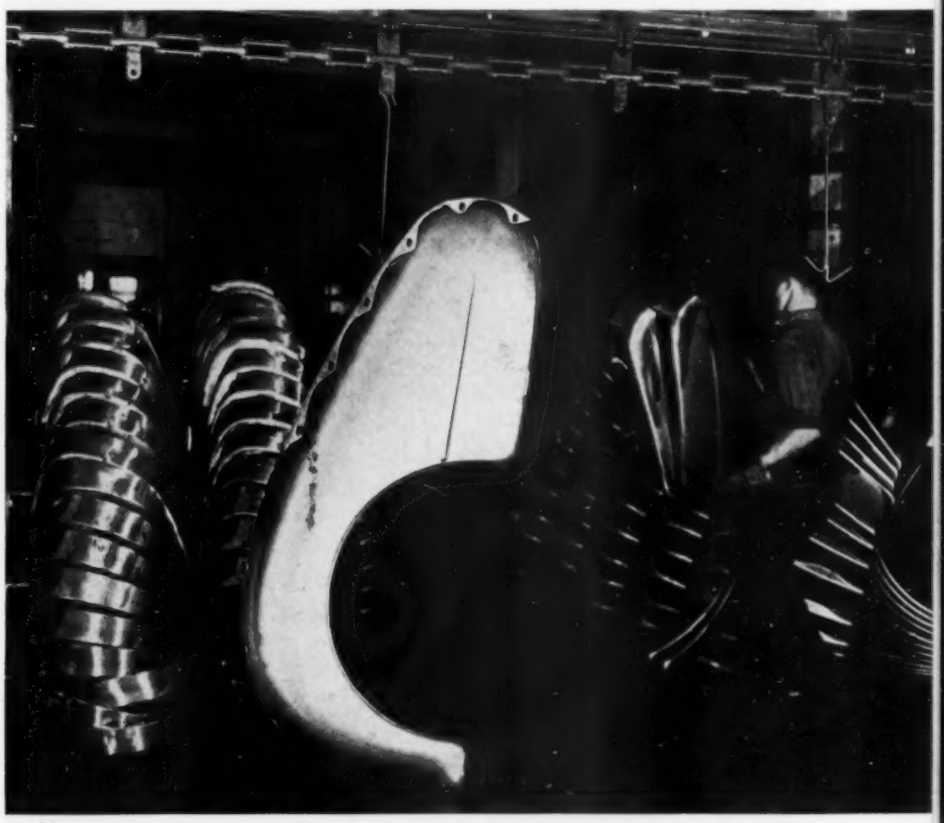
Chain-type conveyor lines are used both for sub-assemblies and final assembly of Pontiac cars. Here, bearings are being installed in the crankcase. There are 5,205 ft. of production assembly line conveyors in the plant in addition to the other material-handling facilities

are handled by overhead conveyors because of the increased cost that would result if they had to be hauled on specially built trucks and trailers. Rollers are used to move heavy parts, such as cylinder blocks, over short distances between adjoining machining operations. Motor and final chassis and car assembly lines are heavy, endless chain conveyors. Parts that are too small or otherwise too unshapely to be handled by mechanical conveyors are loaded into gondolas, flats, racks or trailers and picked up by lift trucks or attached to tractors.

Cranes for Rough Materials

Greatest efficiency in handling rough materials probably is accomplished when it is possible to use overhead traveling cranes. The Pontiac plant was designed with that in mind. Two traveling cranes handle pig iron, scrap iron and scrap steel in the foundry and two others handle sand in the core department. One crane located over incoming railroad tracks in the motor plant takes care of incoming materials. Between the motor and assembly plants another crane over railroad tracks handles incoming materials for the axle and car assembly plants, while within the assembly plant itself one crane operates over its full length, keeping stocks of parts replenished at all stations along the assembly line.

Railroad tracks between the assembly and sheet-metal plants are



Unloading fenders from the 2,500-ft. overhead conveyor line running between the sheet-metal and the storage mezzanine in the car assembly building. This is the longest conveyor line in the plant

served by two cranes with special equipment for unloading and storing chassis frames, which are received in gondola freight cars. Another crane operates over the die room; one in the export shipping department, while the remaining two unload incoming steel for the sheet-metal plant. All railway and highway truck docks are located under cover within the plant, with the result that there is no unloading or loading outdoors.

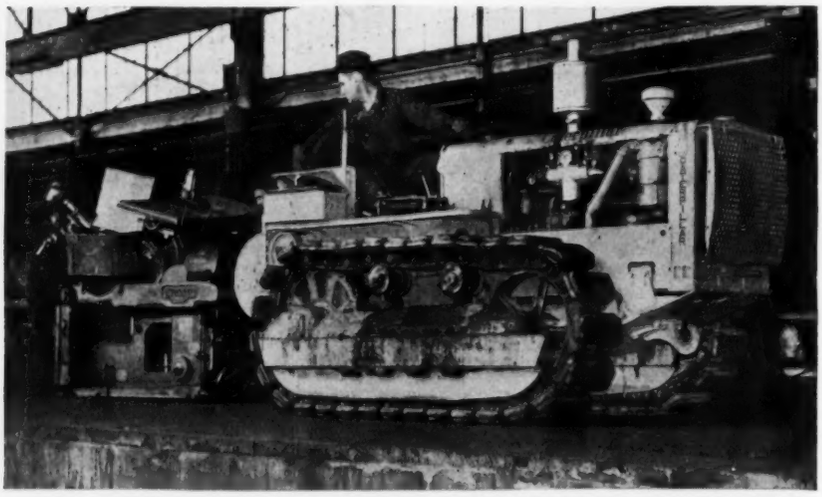
Overhead Conveyors

Efficiently placed overhead conveyors move steadily through many of the departments of the plant. Of the total of more than 36,000 ft. of overhead, production assembly line and miscellaneous conveyors, some 20,000 ft. are located in car assembly plant or else terminate in that plant. Thus, there are 15,171 ft. of overhead conveyors, 5,205 ft. of production assembly line conveyors and 170 ft. of miscellaneous conveyors in the car assembly plant.

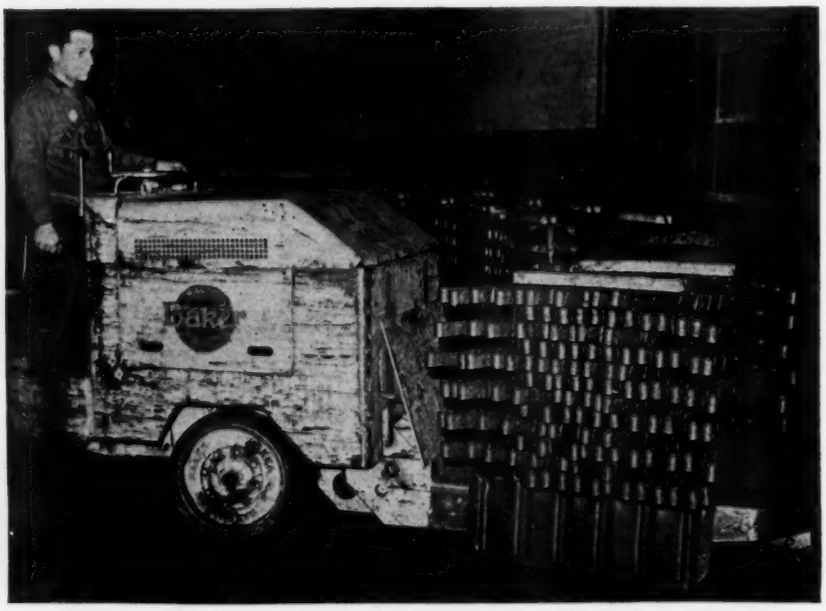
Longest conveyor is the 2,500-ft. overhead line which carries fenders from the stamping plant to the sheet metal storage on the mezzanine of the car assembly plant. Second longest is one 1,900 ft. long which carries hoods and radiator shells from the stamping plant to the paint department. There are six other overhead conveyors in the car assembly plant that are more than 1,000 ft. in length. The final assembly line itself is 1,250 ft. long and there are 1,360 ft. of production assembly conveyors in the final inspection and finish lines. The foundry contains over 9,000 ft. of conveyors.

The 99 industrial trucks are kept in running order in a garage maintained within the plant. These for the most part are electric-battery and gas-electric units varying from three to twenty tons in capacity. All trucks and trailers roll on rubber tires. Truck equipment includes low-lift, high-lift, fork-type, platform tractor type, charging-type and tractor-type units, which are able to perform efficiently every kind of trucking job that is required in the plant. The battery and gas-electric units go to the garage every day for charging and greasing. Each plant and certain departments have their definite assignment of trucks. Car assembly plant heads the list with 24 units in use. Next is the foundry with 20.

Besides the truck equipment there are 3,000 skips; 3,000 flats; 600 trailers for trailer trains; 100 sand hoppers and 200 special racks for cores. These are the receptacles that are loaded with parts and materials and then lifted, carried and trailed throughout the plant.



Tractors move more heavy machinery and other loads too heavy for the smaller industrial-type trucks. Rubber pads are fixed to the treads of this unit



Many parts, like these leaf springs, are piled on skips for transfer by lift truck to subsequent operations, stores, or to the assembly lines

Brazil Nut Cracking

Invention of a machine for cracking babassu nuts by a Brazilian engineer is reported from Rio de Janeiro. The machine sells for about $1,800 and is reported to operate efficiently. It is handicapped by its weight (1,500 kilos) which makes it difficult to transport to the producing zones, generally without transportation facilities.

Chromium Plated Aluminum

Cromalin Ltd., a Birmingham, England, firm has succeeded in its efforts in applying chromium plate to aluminum hollow ware. The company has recently moved into a new plant where facilities are available for dealing with large quantities of work. At the old plant the capacity was some 12,000 aluminum hollow ware articles a week, and at the new factory this capacity has been trebled.

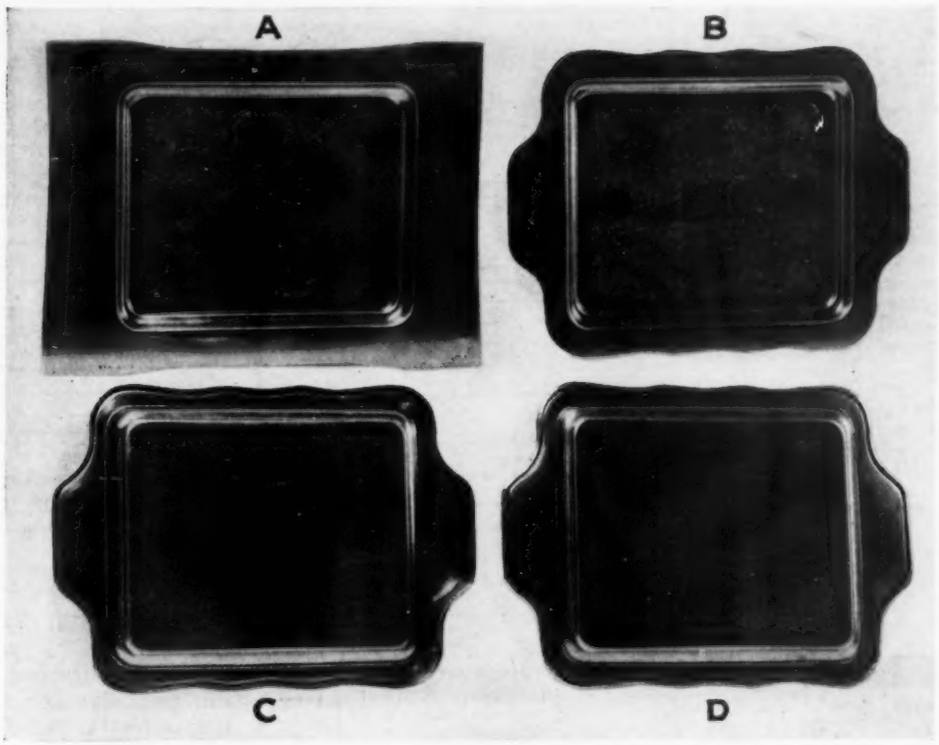


Fig. 1—Four press-work operations are required to make the tray: *A*, drawing; *B*, trimming; *C*, U-ing the edge, and *D*, curling the edge

Dies for U-ing and Curling Non-Circular Trays

Exact templet work is essential in making tools that form the rolled edge; otherwise the edge may be wrinkled or stretched

MARK GOLDEN

DIE WORK often seen but seldom encountered in practice by the average diemaker is that for a non-circular tray with a rolled edge. A round shell with a rolled edge is a simple routine job, but a shell such as shown in Fig. 1 requires accurate templet making and accurate machining and filing.

The first step in making this tray is to cut the blank. The steel is 20 gage, comes from the mill 9½ in. wide and is cut on a square shear to a length of 12¾ in. It is next put through a power-driven straightening roller because the following operation requires a perfectly flat sheet.

An interesting step in making the tray is the process of engraving. The blank is placed on an engraved armor-steel plate and passed through a pair of rolls under heavy pressure. The plate for this particular tray measured 11 x 15 in. The engraving is not cut into the plate but is raised by chisel work.

There are three center punch marks on the plate to serve as location points for the blank. An additional mark on the plate indicates which end of the engraved blank is to be placed towards the back of the drawing die. By use of these marks the blank is placed on the engraved plate and on the drawing die so that the engraving is centralized on the tray.

The rolling is done on the machine shown in Fig. 2. This set of rolls requires 10 hp. to operate, and speed at the rolls is 30 r.p.m. An estimated pressure of 75 to 80 tons is required to put the design on the blank shown in Fig. 3.

The next operation, that of drawing the tray, was done on a No. 1½ Bliss draw press. Since the open-

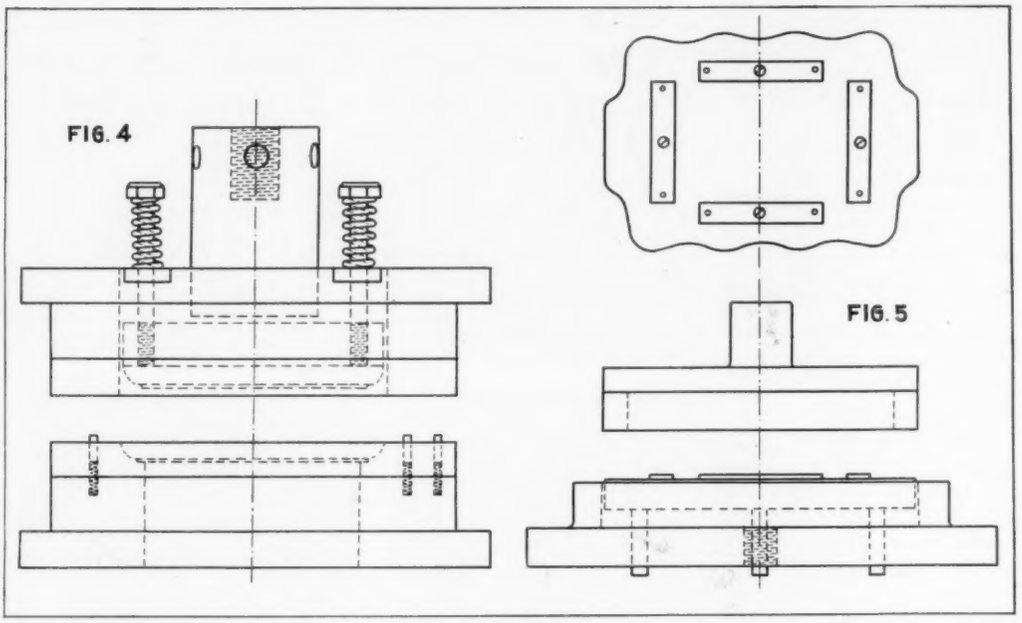
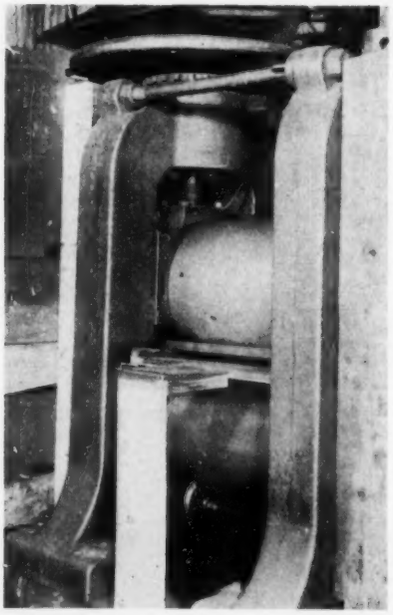


Fig. 4 — Because of press slide limitations, the punch of the drawing die is suspended on four springs, and is actuated by a "pusher." Fig. 5— Trimming must be exact, and in making the trimming die very exact templets must be used



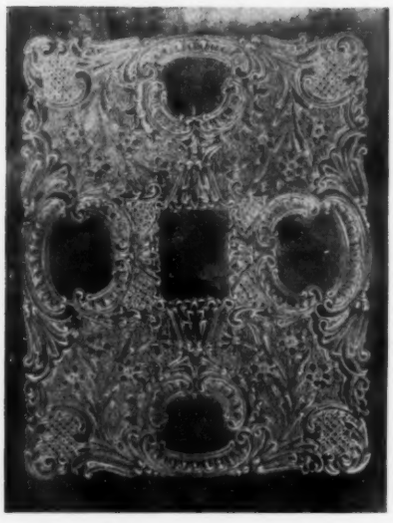


Fig. 3—A rolling pressure of 75–80 tons causes the sheet to conform to the raised design on the engraved plate

Fig. 2—A square-sheared flattened piece is laid on an engraved armor-steel plate and passed through rolls

ing in the blank holder slide was not large enough to clear the punch, the die was made with the punch suspended on four springs, and a "pusher" was used on center slide, as shown in Fig. 4. Three spring pins are used on the die to locate the blank. The body of die and blank holders are cast iron and both are faced with tool steel.

The trimming die for work of this type is of great importance. Both halves of the die, that is right and left of the center line, must be exactly alike within a few thousandths. If otherwise, trouble will be encountered in the U-ing and curling operations. A quarter templet is made and used to lay out the full templet. Two of these full templets are made and must check against each other, both right and left, and any error must be corrected.

The trimming die is shown in Fig. 5. The die is a forged tool steel ring and is mounted on a machine-steel plate after hardening. The punch is likewise a tool-steel-forging attached to a machine-steel back. A machine-steel pad is used in this die and has four $\frac{1}{8}$-in. locating strips attached to its upper face to locate the drawn portion of the tray in proper position for even trimming. By means of pressure pins and a rubber spring barrel, this pad also brings the trimmed tray up out of the die. The blank is placed face down on the die to give a rounded edge on the trimmed blank which is of help later in the curling operation.

Exact templets are required when making the dies for the U-ing and closing the edge of the tray. Several blanks are made in the trimming dies, and one is reduced 7/32 in. all around. A quarter is cut from another blank and likewise reduced and used for checking.

The punch and die for the U-ing operation, Fig. 6, are made the same as for an ordinary blanking die, except that the die opening is straight. The punch *B* is fitted into the die *A* and then reduced in size to allow for the thickness of the metal, in this case 0.032 in. This clearance must be exact. Too much space will cause a wrinkle, while too little will stretch the edge and give too much metal to be rolled over in the closing operation. The punch *B* is then set up in the milling machine, and the step is milled to give the raised border on the tray. The edge on the punch is 5/32 in. wide and 3/32 in. deep. This raised part is given a radius both inside and out by filing and scraping.

The working edge of the die is given a radius of 1/16 in. and is highly polished. Both die ring and punch are tool steel forgings and are not hardened. The die is mounted on a machine-steel plate. The punch is likewise attached to a machine-steel plate and has a shank for holding it in the press. A tool

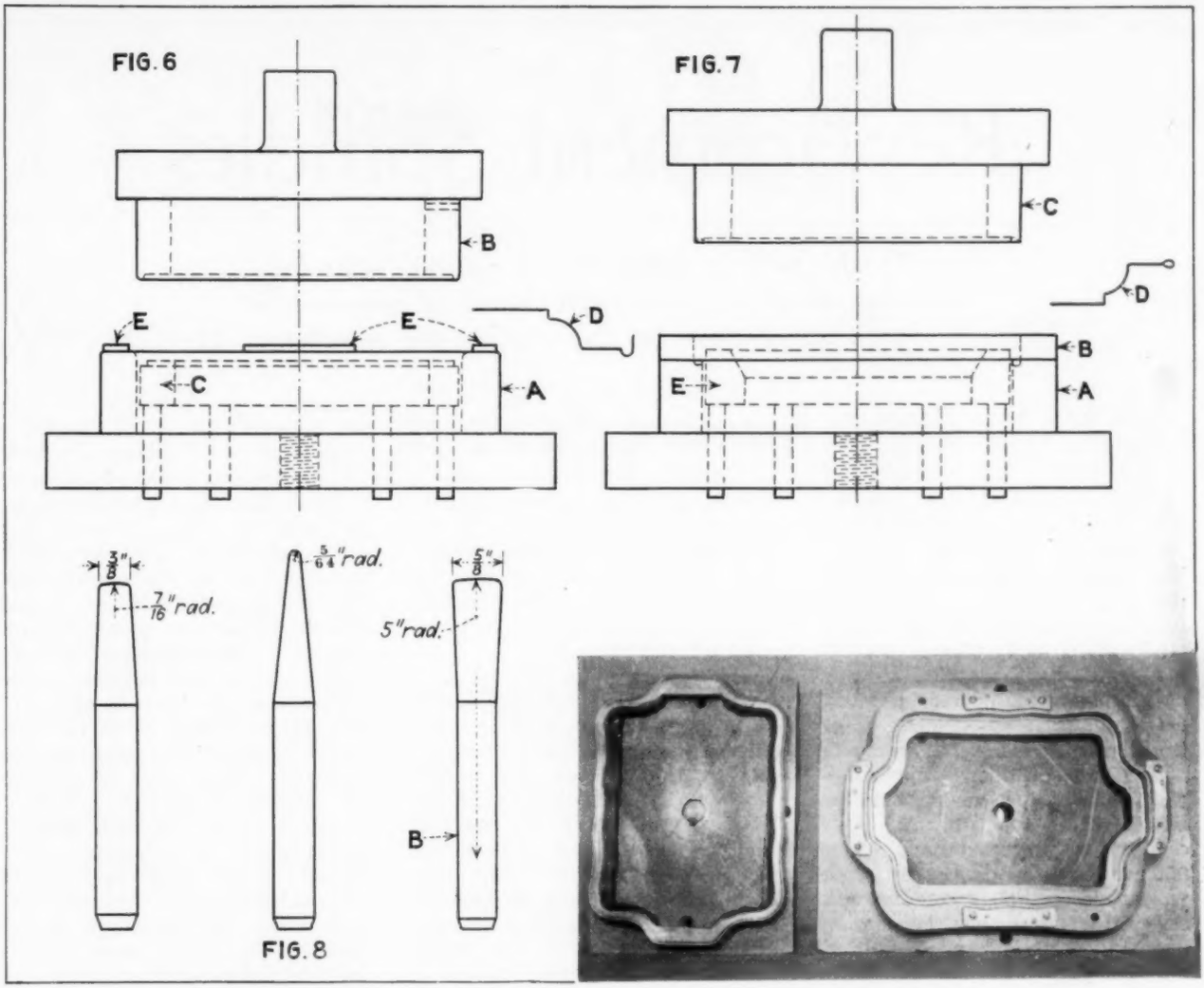


Fig. 6—Punch clearance must be exact in the U-ing die to prevent wrinkles or stretching the metal. Fig. 7—The groove in the die ring *A* is machined with a spherical cutter and finished with special punches. Fig. 8—Both punches have the same radius of 5/64 in. The narrow punch is used to work around the curves on die groove, and the wide punch on the straight portion of the groove. Fig. 9—This view of the U-ing die shows the locating strips for the trimmed shell

steel pressure ring *C* with a step to correspond with the step on the punch is used for dual the purpose of forming the edge on the tray and to eject the work from the die. At *D* is a cross section of the work after leaving the die. At *E* are the gages used for locating the tray.

In principle, the curling die, Fig. 7, follows the same general lines as a round curling die, but the method of making the die is unusual. At *A* is the curling die, at *B* the locating ring, at *C* the punch, at *D* is a cross section of the work after curling, and at *E* is the pressure ring.

Rings *A* and *B* are machined on both faces. Using the templet that was used in making the U-ing die, ring *B* is machined and filed to duplicate ring *A* of the U-ing die. Rings *A* and *B* are then dowelled together and set up on the milling machine. By means of a spherical-shaped cutter having cutting edges only on the end a semi-circular groove is cut in ring *A*, using ring *B* as a guide. The diameter of the cutter is $\frac{1}{8}$ in. and the groove is cut 1/16 in. deep. The groove is later finished by special punches. As this is the final finishing touch on the die it will be described later.

The inside of ring *A* is machined to within 1/16 in. of the groove and filed smooth and straight to receive the pressure ring *E*. The punch is machined and fitted closely in ring *B*. After being mounted on the machine-steel punch holder, the punch is set up on the milling machine together with ring *B* as a guide, and a groove is milled to match the raised edge on the tray as made in the U-ing die. After smoothing and polishing the punch is finished.

The two rings *A* and *B* are next mounted on the machine-steel plate which has a 1-in. threaded hole for holding the spring barrel rod. Holes are also drilled for pressure pins. The final step on the curling die is done by use of punches shown in Fig. 8. Two punches are used. Both have 5/64-in. radii. The wide punch is used on the straight part of the groove, while the narrow one is used to work around the curves. Skill acquired only by experience is required to do this work correctly. By repeated hammer blows, these punches produce a hard semi-circular groove with a mirror finish. One blow must cover the next so as not to show a break in the surface. Ring *B* acts all the while as a guide for the side of the punch. When finished the inside of ring *B* and the groove in ring *A* present a continuous surface.

Replacement Spindles

Trouble with grinding wheel spindles, after the bearings of all types had been cleared of responsibility, was traced down to the steel in the spindles

F. R. BONTE and G. A. STUMPF
Steel and Tube Division
The Timken Roller Bearing Company

ANY COMPANY using grinding equipment is confronted with the problem of spindle accuracy. This problem becomes acute when operating tolerances are close and finish is important. Several factors are involved, such as the accuracy of the spindle itself, the kind and size of bearings used, operating speeds, feed, cooling facilities, and type of work being performed.

The Timken Roller Bearing Company, which operates one of the largest grinding departments in the country, using approximately $500,000 worth of grinding wheels each year, requires the utmost in accuracy and at the same time insists upon a high rate of production from the grinding machines. This requires that the grinding wheels be dressed at short intervals, that operating speeds be high, and that the spindles and their bearings stand up well under heavy duty service. Speeds and feeds were adjusted by test, but the problem of holding spindle accuracy gave trouble. Various sizes and types of bearings were tried, but apparently the spindle itself required study as the slightest degree of whip caused chatter of the work as well as bearing wear, which aggravated the condition. This was noticed regardless of whether bronze or anti-friction bearings were used for mounting the spindles.

Spindle inaccuracy caused rapid bearing wear when bronze bearings were used and this in turn increased chatter marks on the work and reduced accuracy. When anti-friction bearings were used a longer spindle life usually resulted, but certain other problems were brought into the picture when the bearings had to be replaced. When it was necessary to remove the tightly fitted bearing cone or inner race from the spindle so that the spindle could be reground to restore accuracy, it was frequently necessary to hard chrome plate the spindle bearing seat and regrind it to provide the necessary tight fit when the bearing cone was replaced.

Too tight a fit in the case of a bronze bearing caused the spindle bearing surface to check or craze. This rapidly increased the rate of wear on the bearings, even though they were flooded with oil. Experience showed that it was not possible to remove these check cracks by grinding, so that when they developed it was necessary to scrap the spindle. Pre-loading in the case of anti-friction bearings had a tendency to cause similar trouble.

Maintenance Costly

Various types of spindle steel have been used in the Timken plant and until recently the best results were secured from SAE 1045 steel. However, maintenance costs seemed too high and too much difficulty was experienced in holding the required degree of accuracy in the work turned out by the grinding machines. Consequently a study of the spindles themselves was made.

Formerly, considerable difficulty was experienced in the manufacture of replacement spindles due to warping in the hardening process. This was particularly troublesome when the spindle had been finish machined before the hardening. The success of Graph-mo, a non-warping oil hardening steel developed in the Timken plant for use in the die industry (*AM*—Vol. 81, page 207) led to its being tried experimentally as a spindle steel. Results were so successful that this material is now being used exclusively in all replacement spindles in the Timken grinding departments.

Three fundamental reasons appear to justify this change. In the first place, graphitic steel replacement spindles can be machined in approximately half the time required for making the same part from spindle steel. No difficulty has been experienced in hardening these new replacement spindles without warping to 30-35, 40-45 or 56-58 Rockwell C as desired, the largest spindle hardened to date being $4\frac{3}{4}$ x 40 in. for a No. 3 Cincinnati grinder. Finish grinding has been reduced to the removal of only 0.030 in. or less of material from the hardened surface. And finally, tool room records show that the Graph-mo replacement spindles have an operating life of from two to three times that formerly secured.

No checking has been noticed and bronze bearings last many times longer with graphitic steeel spindles than they did formerly. Likewise, no difficulty has been experienced in pressing off and replacing bearing cones, which in part may be attributed to the structure of the steel, previously described.

Heat-treatments used at the Timken plant to secure desired hardness in Graph-mo replacement spindles are as follows: For 30-35 Rockwell C hardness, quench in oil from 1500 F. and temper at 1100 F. for 2 hours per inch of section. To develop a hardness of 40-45 Rockwell C, the spindles are tempered at 900 F., and where a hardness of 56-58 Rockwell C is desired the spindles are tempered at 700 F. Spindles hardened to 30-35 and 40-45 Rockwell C are heat-treated, machined and then ground, but in the case of the spindles hardened to 56-58 Rockwell C, the practice is to rough and finish turn the spindle before hardening, then heat-treat it, and finish grind after the hardening operation.

ROUND TABLE

Spite Fence

"Al, how's that job for Tilden & White coming along? Seems to me that you promised to ship those plates by the end of this week."

"They'll go out on time, Ed., but we'll be working up to the last minute to do it. I had hoped to have a couple of days to spare, but Sam Wilcox stymied me on one of my bright ideas and we had to make up a drill jig for the job."

"How in tarnation could you expect Sam to help you out? He's been doing that work for some time and probably feels put out that the contract went to you this time."

"Well, Ed, when Tilden gave me the order he told me that Sam had been turning out some sloppy work recently and that he was giving me the work because he wanted quality as well as price to count. He seemed to think that Sam would sell me the jig, since he probably wouldn't be able to use it again. With that in mind I gave Tilden a close date and it almost backfired on me."

"Sorta counted your chickens before you bought your eggs, didn't you, Al. If I'd been in Sam's place I think I'd have told you to go jump in the lake."

"That's just what he did, Ed.

Only not in so many words. He was willing to sell the jig — but he wanted about three times what it had cost him to make. He knew darned well that Tilden wouldn't give him the job again, so he probably figured on sticking me for a share of the profits. Now I've a jig of my own and he's left with a tool he can't use."

Can a shop operator afford to let his personal feelings influence his business affairs?

DISCUSSION

Gift Horse

"Giving of gifts to supervisors should be prohibited in all cases, with the possible exception of those given as tokens of esteem at the end of a long period of service," says L. C. Mason, inspector, North American Aviation Company. He points out that: "Men who do not give-to-get are rare." In much the same vein, H. C. Rose, master mechanic, Anaconda Wire and Cable Company, says that: "None of us rate 100 per cent with all of those who work under our supervision, so any gift given by the men generally is started by a few and the rest, while not anxious to donate, chip in to avoid being called tight." Mr. Rose goes on to cite a personal experience to show that such gifts can be refused without causing hard feelings. Charles H. Willey, in discussing this problem, reminds us that: "No matter how conscientious a supervisor may be, it becomes increasingly difficult for him to deal impartially with those from whom he has accepted gifts."

Shock Absorber

James K. Matter, in discussing Al's plan to use Harry Weston for taking up the slack in various machining operations, reminds us that: "No planning is perfect; only about 85 per cent of our best laid plans work out. A seasoned old-timer probably could work wonders with the missing 15 per cent by pinch-hitting for a missing man or manning a duplicate machine to relieve a bottle-neck." On the other hand, Rudolph L. Behounek believes that, as a general rule foremen need not go out of their way to hire such a man in the hope of balancing production; even though such a man may be useful in individual cases.

Train In Vain

"A foreman who expects to gain the confidence and respect of his men must be interested enough in their welfare never to stand in the way of promotions, even if the promotion may cause him to lose a good man," says Nils H. Lou, tool room foreman, The Glenn L. Martin Company. He points out that the foreman should have an understudy for each important job, so the loss of a man should not mean too much. Writing in much the same vein, John E. Hyler says: "There is no economic advantage to be gained in allowing any foreman to retain any more than an equal share of plant talent, even though that foreman may have been the means of bringing much more than his own share to the peak of efficiency."

"It is natural for a foreman to complain of conditions where his best trained men are sometimes removed to other sections of the plant," writes G. McArdle. He goes on to point out that "Such removals usually are in the best interests of all concerned, since departmental is of secondary importance to plant efficiency." Likewise, Arthur Silvester writes: "Every executive worth his salt always is on the lookout for apprentices who have the essentials necessary to the make-up of a future key man."

Wages Warranted

F. P. Terry of Belfast, Ireland, thinks that the employee would have to restrict his personal liberty by guaranteeing a full year's work in the event that the employer guaranteed him wages on an annual basis. He doubts that many workers would welcome any such scheme.

New Home to Shop

Office building is by the Landis Tool Company

FRANK W. PENSINGER
Landis Tool

SLIGHTLY OVER a year ago the Landis Tool Company decided to erect a new office building and remodel an older one. Quarters that at one time had been quite adequate were crowded.

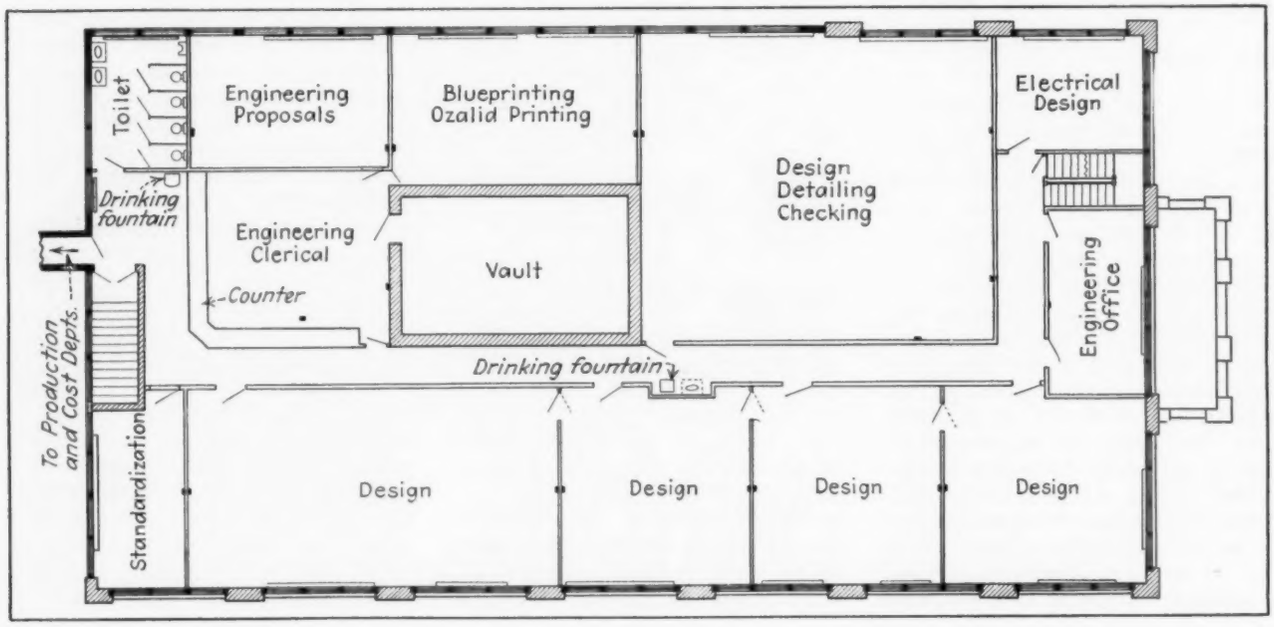
The carrying out of building operations presented a real problem for there was no available space that could be used temporarily as an office. It was fortunate, however, that the ground floor of the building which housed the executive, sales, accounting, and purchasing offices was not used for office purposes. Although the building was moderately old, its steel framework was found to be entirely satisfactory for use in a modern new building.

The ground floor of the building was emptied, and work got under way. Everything was torn out but the steel framework, while at the same time a 32x60 ft. addition was started. When the new outer walls rose to the old outer walls of the second floor, these latter walls were removed in sections, the new walls immediately replacing them. At last the old roof was reached and an entirely new roof took its place. All the while the second floor was being used, noise and dust notwithstanding. In the meantime, work had been proceeding on the inside of the new ground floor.

As soon as the ground floor was finished, offices were moved down to their new permanent quarters. This was followed at once by a complete gutting of the second floor. When it was finally completed the engineering department, which had always been housed in an adjoining building, moved in.

Executive offices are air-conditioned by a plant installed in the basement. Drinking water for all offices is cooled by a small refrigeration unit adjacent to the air conditioning plant. Venetian blinds are used throughout, thereby making possible close regulation of natural light. All partitions are of

Above—An old building torn down to its framework together with a new addition resulted in these modern office quarters. Below—Engineering quarters on the second floor are arranged about a vault containing all drawings and tracings



a Help Management

rebuilt and enlarged without interruption to business

and FRED A. FIRNHABER
Company

President J. Elmer Frantz, who recently celebrated his 47th year with Landis, occupies one of the attractive air-conditioned executive offices

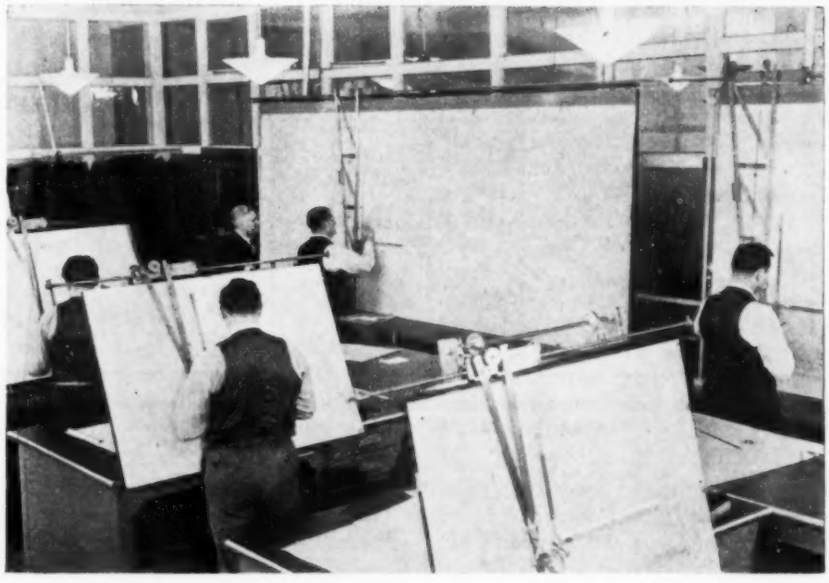
glass. Indirect artificial light is used, illuminating engineers having carefully determined requirements before installation. No longer are the conventional desk and table lights seen—they have gone the way all obsolete equipment should go.

An abundance of electric outlets make it possible to plug in electrically operated office equipment practically anywhere without extensions. The executive offices are finished in walnut with tables and leather covered chairs to match the woodwork; elsewhere the finish is a soft olive green. Asphalt tile flooring is used in the ground floor offices of the new building.

The new engineering department, completely revamped, occupies the entire second floor of the new office building. Instead of housing the entire department in one large room, numerous smaller offices and drawing rooms are now used. In these sub-departments are the 74 people designated to engineer and detail machines of various types built by the company.

Lighting Planned Carefully

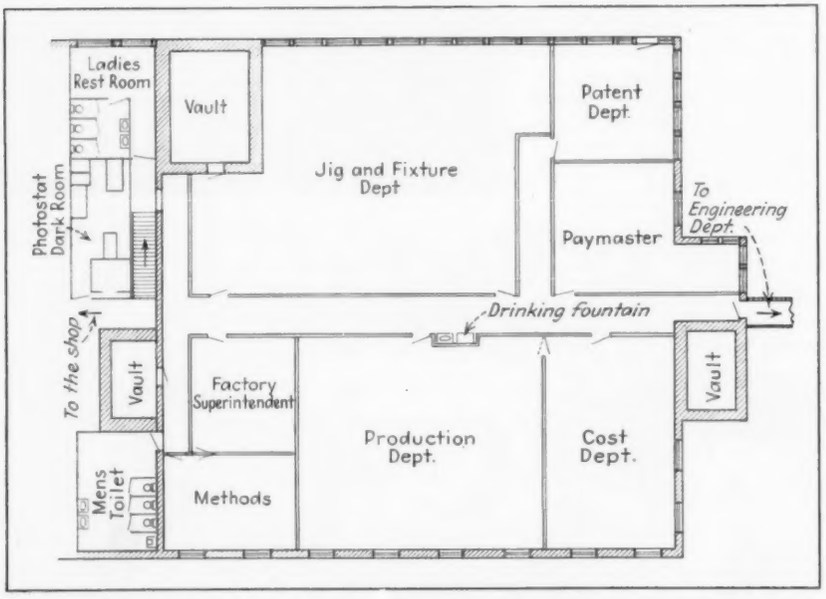
Wooden floors are used throughout in the new layout. Because much of the work is done by the draftsman in a standing position, these wooden floors were considered as contributing less foot and leg fatigue than cement floors, thereby increasing the men's efficiency. To overcome the necessity of both overhead and individual board lights, the same indirect lighting arrangement was installed as in the lower offices. White ceilings and white walls above a wainscoating of soft green reflect the correct amount of light, making unnecessary the use of eye shields.



Full sized layouts are designed on the large boards in the background while subassemblies and details are made on the inclined boards in the foreground

One or two large Emmert vertical drawing boards 6 by 14 ft. in size flank one side of each design room. It is interesting to note that the counterweights for these heavy boards are not behind the boards as formerly but out of sight in the space between the ceiling and the roof above, the cables for the counterweight passing through the

A counter outside the vault is the business meeting place for head designers and shop personnel



Jig and fixture, cost, production and methods departments form a natural link between the engineering offices and the shop proper

ceiling. At these boards the head designer or group leader lays out designs full scale while behind him are grouped smaller boards for the designers of sub-assemblies and the detailers. Thus the department is self contained. The smaller inclinable Emmert boards, standardized to sizes 28 by 42 in. and 34 by 48 in. are mounted at an angle of approximately 22 deg. At these latter boards the men can either stand or sit, the boards being adjustable to any desired height. The backs of the boards, counterweights, ropes and pulleys are painted with aluminum so as to increase light reflection.

Previous to moving into its new quarters, the purchasing department was custodian of all catalogs and books. This arrangement required much too frequent contact between this and the engineering department. In the new set-up, the new standardization department, in the engineering office, now maintains a library system for the filing of catalogs, engineering text and handbooks and technical magazines.

Fire proof vault walls extend up through the approximate center of the engineering department thereby making it easily accessible to each individual design room. Directly outside the vault is the "counter," a long continuous table with inclosed front extending at right angles around two sides of the room to form a separate office. At this counter all transactions are made between the various engineering departments and the shop making it unnecessary to disturb others in each design office. The counter is constructed in skeleton form to accommodate numerous three-drawer steel cabinets for filing all active parts lists and special orders. In the space so inclosed, all the clerical work pertaining to design is done, parts lists typed, changes made and recorded, repair orders received and dispatched, blueprints, ozalid prints and photostats issued and parts for special machine orders specified. Being centralized, all drawing supplies are also kept here.

A new continuous blueprinting and washing machine was installed in the new blueprinting room. Photostating was formerly done in this department, but this was found to be unsatisfactory. The equipment is now in a separate dark room in which the printing is done at specified periods.

Shop Offices Handy

The space on the second floor adjacent to the new building that formerly housed all the executive and business offices, most of the designing department and information booth, has been completely remodeled. This building is connected to the new one by inclosed passage. Here are located the tool and fixture drawing room, production and cost departments, shop superintendent's office, methods department and also the patent and paymaster's departments. In one corner of the tool and fixture department are located the tracers. Whereas the production and cost offices were originally located on the ground floor of the shop proper, they are now more advantageously situated, being adjacent to the designing department with which most business is transacted.

This move has resulted in larger and better lighted quarters with quieter and cleaner surroundings.

AMERICAN MACHINIST *Reference Book Sheet*

Lubrication Guide for Inclosed Gears

Recommendations for oils for spur, helical, bevel and herringbone gears, as compiled in the accompanying table, take into consideration the type of duty, whether the same product is to lubricate both the gears and bearings, whether a circulation or splash system of lubrication is used, and the ambient temperatures. This table is employed by the lubrication salesmen of the Standard Oil Company of New Jersey, and was suggested by Mr. Bohmer for use by those who service gears.

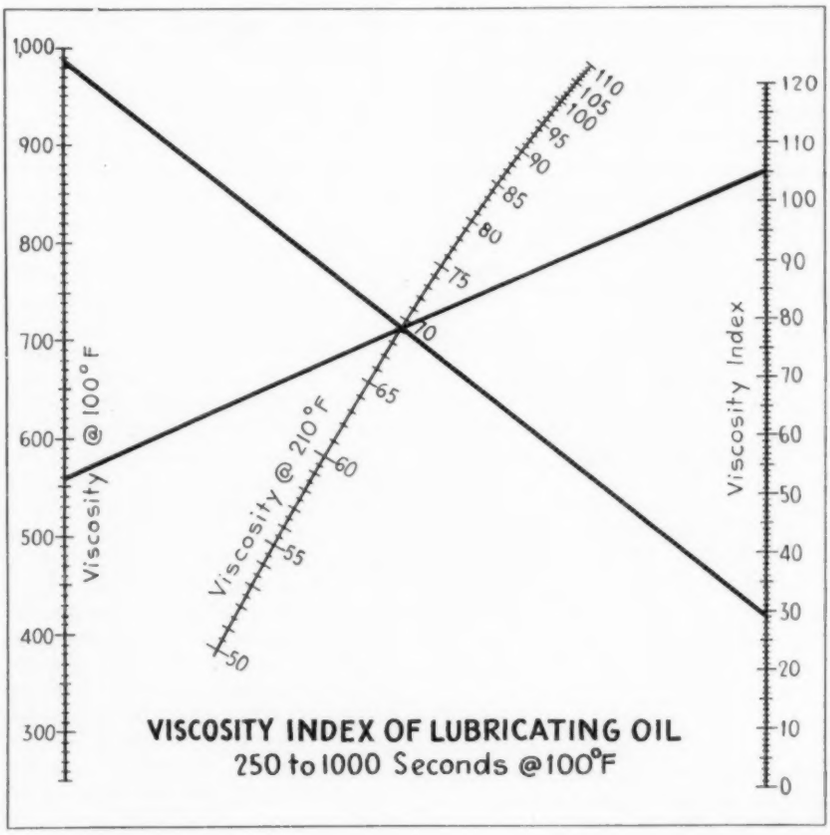
Abstracted from a paper "Gear Lubrication" presented before the American Gear Manufacturers Association, April 1938, by C. W. Bohmer, Jr., Engineering Division, Sales Department, Standard Oil Company of New Jersey.

Recommended Viscosities for Gear Oils

(Oils for spur, helical, bevel and herringbone gears)

OPERATING CONDITIONS*							Viscosities	
Duty			Lubricant Serves		Lubrication Method			
Light	Moderate	Heavy	Gears & Bearings	Gears Only	Circulat.	Splash	@ 100 F	@ 210 F
X			X		X		314	55.3
	X		X		X		314	55.3
		X	X		X		560	69.2
X				X	X		457	63.7
	X			X	X		560	69.2
		X		X	X		906	87.4
X			X			X	560	69.2
	X		X			X	791	82
		X	X			X	1,118	97
X				X		X	791	82
	X			X		X	1,118	97
		X		X		X	1,771	125

* For operation below 32° F.. use next lighter grade.
For operation above 140° F., use next heavier grade.
For worm gears: use one grade heavier if worm drives wheel from underneath; use two grades heavier if worm drives from above.



It is quite necessary that good viscosity temperature characteristics should be had in lubricants for gear sets operating under widely varying temperatures. The higher the viscosity index, the less change in viscosity with change in temperature. The accompanying nomograph can be used for determining the viscosity index, or V. I. of a lubricant, if the viscosities are known for 100 F. and 210 F. For example, if the viscosity of a gear oil is 560 at 100 F. and 69.2 at 210 F., these two points on the viscosity scales are connected, and the line extended to the viscosity-index scale, where the V.I. is found to be 105. Importance of high V.I. can be gathered from these facts: If the V.I. for an oil having the same viscosity of 69.2 at 210 F. is only 29, its viscosity at 100 F. will be 985 — 75 per cent higher than the 105 V.I. oil. Furthermore at 0 F. the 29 V.I. oil will have a viscosity of 700,000 as compared with 55,000 for the 105 V.I. oil. Obviously, gear oil with a poor V.I. may not function satisfactorily, if at all, at low temperatures.

IDEAS FROM PRACTICAL MEN

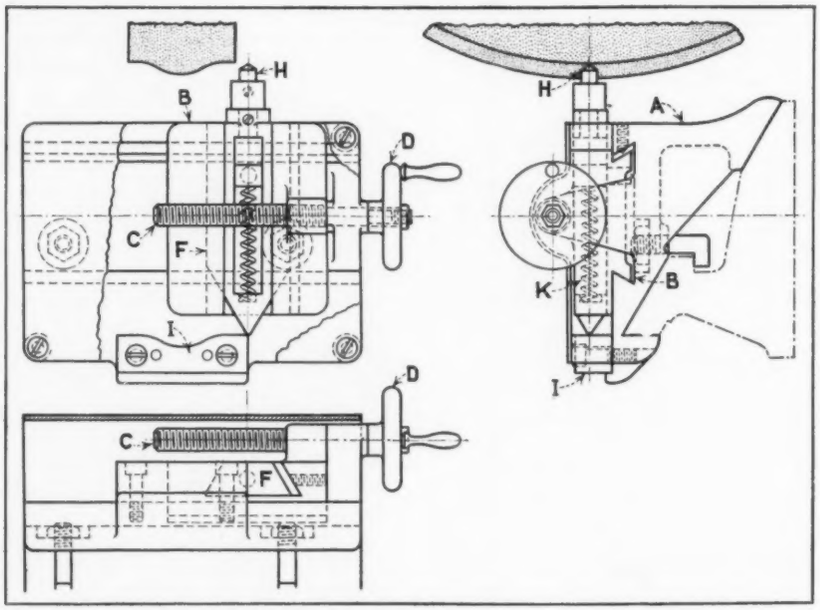
Fixture Dresses Wheels to Special Shapes

J. R. WHITTLES

This fixture for dressing abrasive wheels to special shapes has two slides, the upper one of which travels at a right angle to the lower one and carries a diamond at its front end. At the rear end it is tapered to a point that is kept against a master form by a spring. The lower slide is for traversing the diamond across the face of the wheel. The entire top of the fixture is covered by a splash guard to prevent the gritty coolant from entering the bearings.

The body *A* carries the slide *B* which is traversed across the face of the wheel by the screw *C* when tne handwheel *D* is turned. Slide *B* carries the cross-slide *F*, on the front of which the diamond *H* is mounted. At the rear end the slide is tapered to a point. The point is hardened and is kept against the master form *I* by the spring *K*. The master form is doweled to the body of the fixture and can easily be removed to substitute another.

In operation, when slide *B* is traversed across the face of the wheel by turning the handwheel *D*, it carries with it the cross-slide *F* on which the diamond *H* is mounted. Since the point on the rear end of the cross-slide is kept against the master form *I* by the spring *K*, the cross-slide and the diamond follow the contour of the master form and transfer it to the face of the wheel. Sharp corners should be avoided in the form, because the grinding wheel will not stand up.



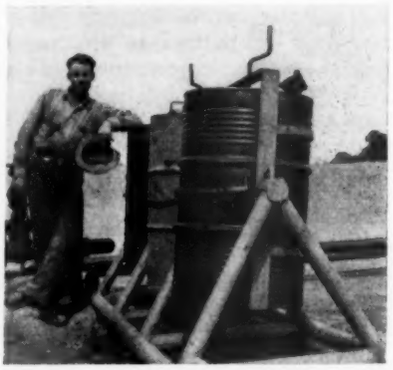
The cross-slide is guided by a master form, the contour of which is transferred to the face of the wheel by a diamond traversed across it

Rack for Oil Drums

ELTON STERRET

Built up from 3-in. pipe by welding, the rack for oil drums illustrated carries three drums, each in an individual pivoted frame. Two bands in front and a spring-tensioned chain at the back hold each drum in place. Centered over the head of each drum is a combined screw and crank, so arranged as to be screwed against the head to prevent the drum from shifting when tilted to draw off the required amount of its contents.

The rack holds the drums high enough above the ground to permit cleaning under them. The pivots are enough above the center heights of the drums to cause them to stand upright, yet not so high as to prevent one man from tilting them. The drums are painted different colors to indicate the grades of their contents. During yard clean-up time, the rack can easily be skidded aside by a truck and then be put back after the oil-soaked soil has been cleared away and replaced.



Each drum is carried in a pivoted frame and can easily be tilted by one man and held by the crank and screw while drawing off the required amount of oil

Self-Acting Tool for Undercutting

H. MOORE
Leeds, England

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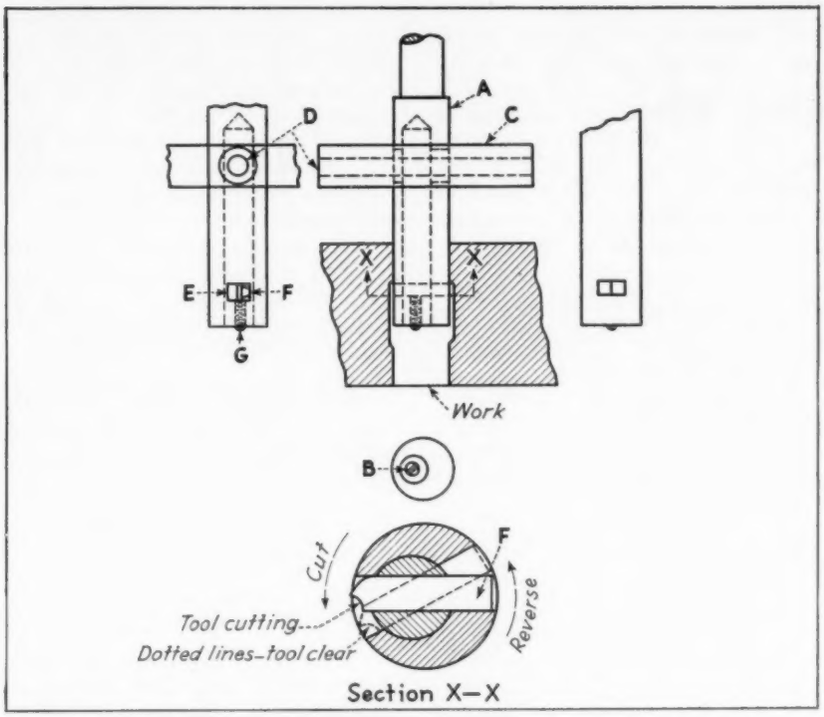

Inertia of flywheel collar *C* moves the tool *F* into or out of cutting position as the machine is reversed

The action of the tool is as follows: To enter it in the hole without cutting it is reversed and the operator touches his ginger lightly on the top of *C*. This causes it to pull the tool over to the position shown in the dotted lines in the section. Once in the hole the machine is run right handed and the collar is touched to bring the cutter out. It is not necessary to keep the finger on *C*. One touch does it. As a matter of fact, the tool is self acting if it is made free and kept clean. Inertia moves collar *C* around each time the machine is reversed.

Press Tools for a Small Lever

CHARLES H. WILLEY
Superintendent of Manufacturing
Hoyt Electrical Instrument Works

The press tools illustrated were designed for forming the blank *A* into the shape shown at *B*. The material is 1/32-in. soft brass and the blank is $\frac{3}{8}$ in. wide and $2\frac{1}{2}$ in. long. The finished part is used as an adjusting lever in one type of our meters. Two views of the tools are given; one in perspective where the ram is at the top of its stroke and the blank is in position for forming; the other in section where the ram is at the bottom of its stroke and the forming has been completed. Like letters refer to the same parts in both views given below.

The blank is located by the two pins *C* in the pressure pad *D* engaging holes previously pierced. As the ram descends, the spring-actuated member *F* comes into contact with the blank, and as the ram continues its descent the spring is compressed and the downward movement of member *F* is arrested until the punch holder comes into contact with it. Then it resumes its downward movement in unison with the ram and carries the pressure pad down against the pressure of the rubber buffer *H* below the die.

In the meantime, punch *I* has come into contact with the unsupported middle of the blank and has started to force it down between the adjacent faces of the pressure pad and the block *K*, and when the ram reaches the bottom of the stroke the forming is completed, as shown in the sectional view.

Dies Make Two Pieces Per Stroke

FORREST L. JOHNSON
Curtiss-Wright Corporation

The article by W. Z. Fidler (*AM*—Vol. 82, page 28) deserves comment. Dual or multiple designed tools have their place in an economical tooling program. The above idea can be used in most types of tools, especially in blanking and forming dies.

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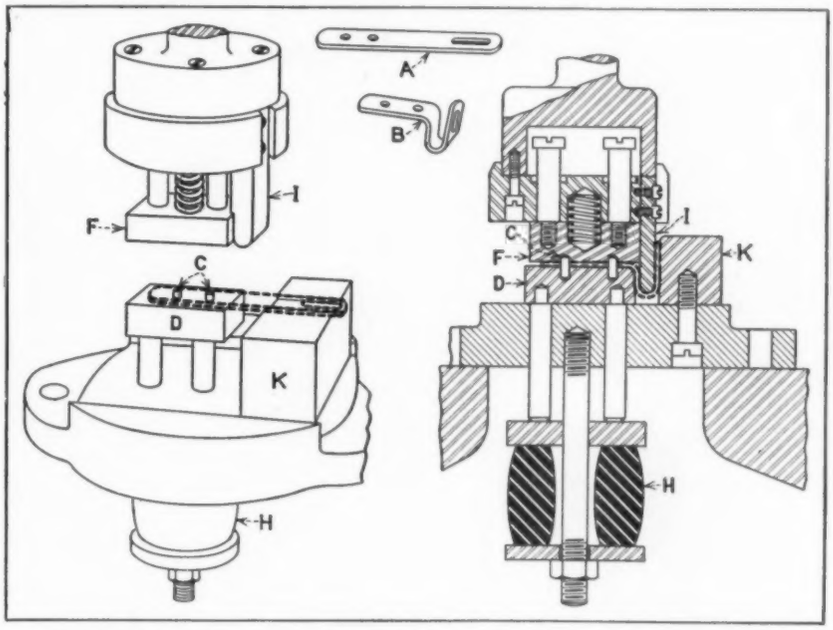

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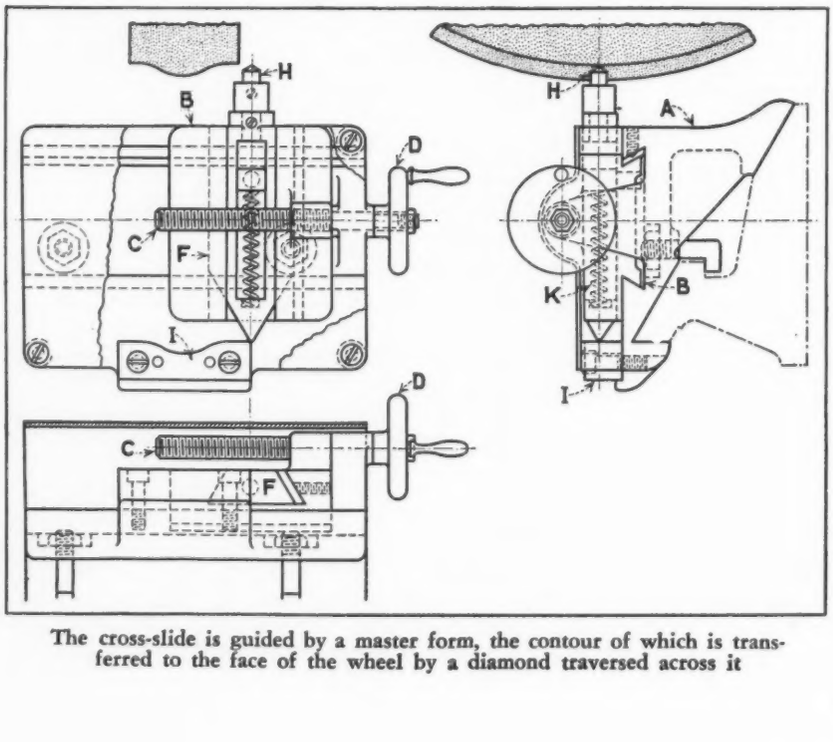

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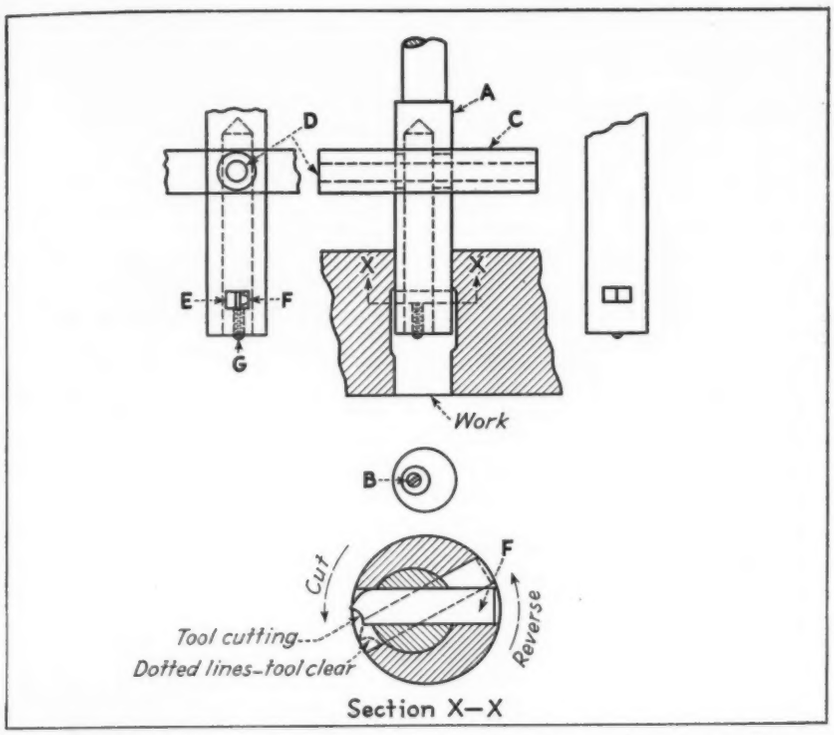

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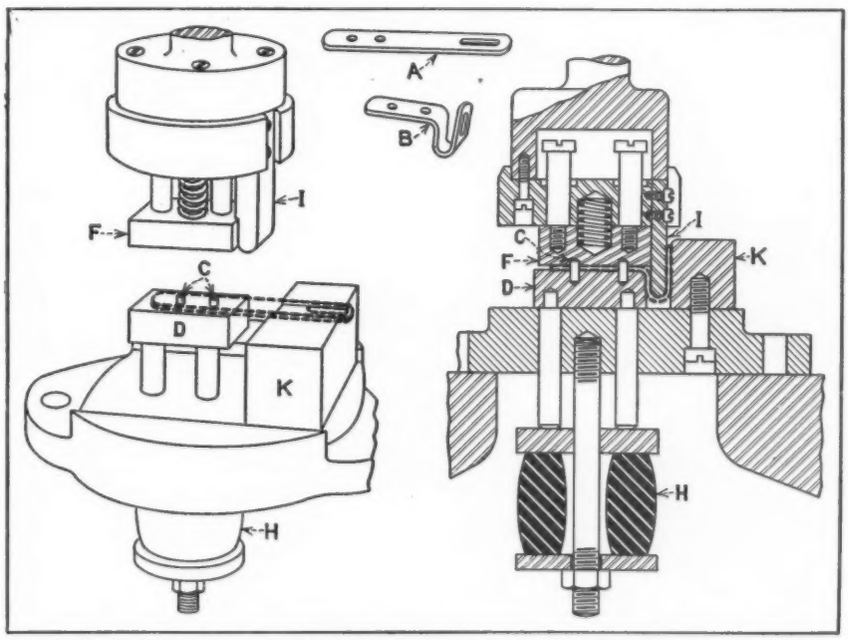

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and located one to the right and one to the left of the punch on the die holder.

With proper planning but one set-up is required to make the necessary runs per order, since but one tool number, one design and one tool are to be accounted for.

Back Counterbores and Tangless Drills

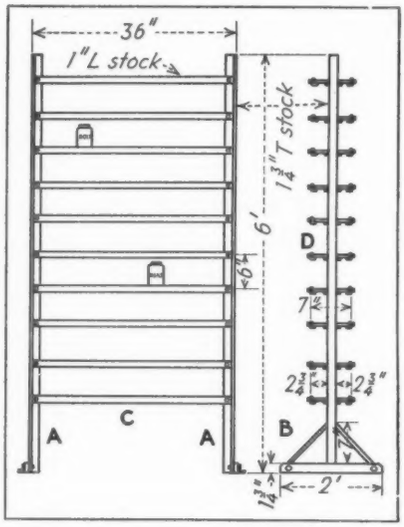
ARTHUR SILVESTER

R. G. Hewitt described a method for driving drills that have broken tangs; also back counterbores with or without broken tangs (*AM*—Vol. 81, page 1277).

I do not think Mr. Hewitt's method should be recommended. If the drill shank should break, due to being weakened by the slots, the taper hole in the spindle would be ruined. I feel sure that after the device has been used a few times the drills will not run true, owing to burrs caused by the retaining blocks being forced into the slots in the shanks inside the spindle. If the device were not carefully used, damage would also be done to the outside of the spindle itself by hammering on the collar. Further, the device could be used only where drills were held in the spindle.

Referring to the illustration, a simple method that is widely used where back counterboring is an everyday job is shown at *A*. A hole is drilled and taper reamed through the spindle and the shank of the tool, and a taper pin is driven in. The pin takes most of the driving strain from the tang and prevents the tool from being drawn out of the spindle by pressure of the cut.

In a certain shop, the shank of a drill having a broken tang is put into a taper hole in a cast-iron block such as the one at *B* and a piece of steel for a new tang is clamped at *C* and is tack welded to the broken end of the tang. The drill is then removed from the block and the weld is completed. The new tang is thick enough to be finished by grinding.



Small parts kept in glass jars in this rack are plainly visible and the workman can readily select the jar containing what he requires

Rack for Screws, Nuts and Rivets

C. F. FITZ

Having a large quantity of screws, nuts and rivets of various sizes in our metal pattern shop to take care of and keep in an orderly manner, we made the rack illustrated.

Essentially, the rack consists of the two uprights *A* made from ½-in. T-iron; two feet *B* made from 1¾-in. angle iron and riveted to the uprights; shelves *C* made from ⅛ x 1-in. angle iron and attached to the uprights by ⅜-in. threaded rods having nuts at the ends; and pieces of pipe *D* used as spacers to give the proper distance between the angle irons for each shelf.

The screws, nuts and rivets are kept in ordinary 1-lb. peanut-butter jars placed on the shelves and are plainly visible, the size being indicated by a label on each jar.

This rack has saved considerable time, energy and money by preventing loss of screws, because the patternmaker takes the entire jar to the job.

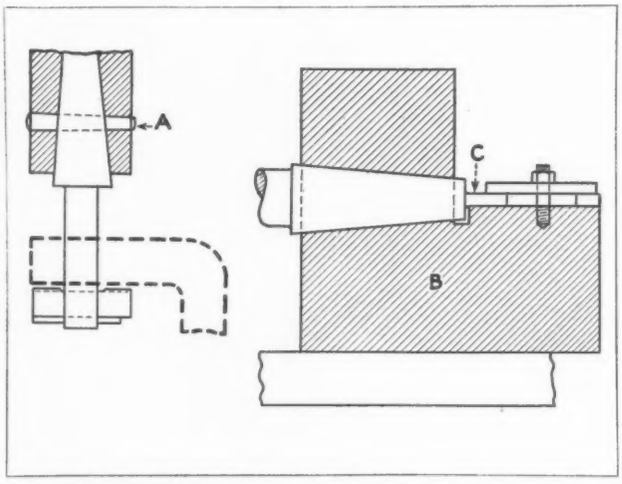
Locating Tool for Drilling Crossholes

EDMUND JACH
The Oilgear Company

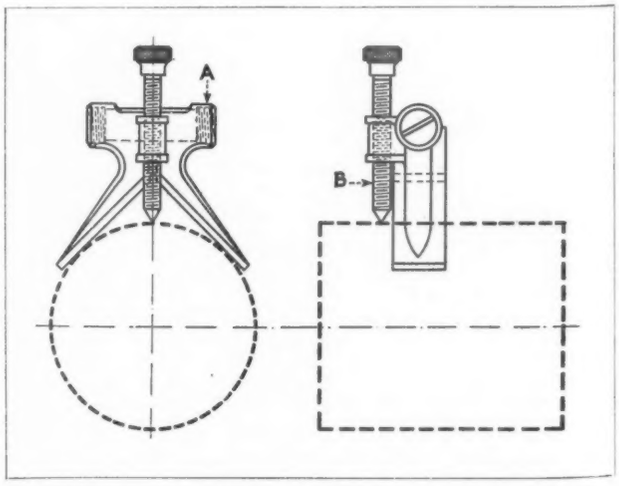
In drilling crossholes in round bars without a jig it is difficult to drill them directly through the center, so the tool illustrated was designed to obviate the difficulty.

Essentially, the tool consists of the body having two legs subtending an included angle of 90 deg. and is similar to the centering head of a combination square; the level *A;* and the screw *B* which is pointed.

The work is mounted in V-blocks and the location of the crosshole to be drilled is marked by a prick punch. The tool is placed on the work, as shown, and the point of screw *B* is engaged in the prick-punch mark. The bar is then rotated in the V-blocks until the bubble in the level is in the center of the glass tube. A drill started in the prick-punch mark will now pass through the center of the bar.



Back counterbores are prevented from coming out of the spindle by a taper pin. New tangs are welded on drills when the old ones are broken



With the tool on the work and the point of screw *B* in the prick-punch mark, the work is rotated until the level shows it is in correct position

NEWS OF THE INDUSTRY

Labor Matters to Claim Metal Trades' Interest

Practical approach sought to good industrial relations

CHICAGO—Full discussion of labor problems confronting its members will occupy the attention of the National Metal Trades Association, which will hold its fortieth annual meeting at the Biltmore Hotel, New York, May 25–26. The program follows:

Wednesday, May 25

11:45 a. m.—"More Stable Employment and Economy"—W. E. Odom, William Odom Associates, Chicago.
2:00 p. m.—"Keeping Ahead of the Headlines"—Frederic Snyder, lecturer-publicist.
2:45 p. m.—"An Appraisal of Factors in the Labor Relations Situation"—Harold F. Browne, director of industrial management division. National Industrial Conference Board.
3:15 p. m.—"Employee Meetings with Management"—C. S. Craigmile, vice-president, Belden Manufacturing Co.
3:15 p. m.—"How We Handle Our Employees"—C. C. Winegardner, vice-president, Diamond Chain & Mfg. Co.
4:00 p. m.—"Legal Aspects of Labor Relations"—David R. Clarke, Fyffe & Clarke, Chicago.

Thursday, May 26

9:30 a. m.—Assembly.
9:45 a. m.—"A Community Program"—T. J. Morton, Jr., President, Hoosier Lamp & Stamping Corp.
10:30 a. m.—"Restoring the Control of Wages and Working Hours to Management"—Allen W. Rucker, president, Eddy-Rucker Nickels Co.
11:15 a. m.—"Job Evaluation"—Report of N.M.T.A. Committee Chairman. O. D. Reich, vice-president, Dexter Folder Co.
1:30 p. m.—"Metal Age or Paper Age"—Col. W. T. Chevalier, vice-president Mc-Graw-Hill Publishing Co.
2:15 p. m.—"What the CIO Has Done to Michigan"—Hon. Clare E. Hoffman, Congressman from Michigan.
3:00 p. m.—"What Is Wrong With American Business Men"—P. C. Jones, president, The S. M. Jones Co.
3:15 p. m.—"America Wants to Know!" C. Wayland Brooks, attorney, Chicago.
4:00 p. m.—Election of Officers.
7:00 p. m.—Annual Dinner Speaker—Honorable Josiah W. Bailey, Senator from North Carolina.

U.A.W. Divided Into Three Camps as Leaders Split

DETROIT—Homer Martin's demotion of Richard Frankensteen from the rank of assistant president of the U.A.W. has added fuel to the automotive labor fire. The action is reported to have ended the Martin-Frankensteen coalition, already strained when Frankensteen sent a memorandum without Martin's approval to members of the U.A.W. board on "how to end factionalism."

Now the U.A.W. is divided into three camps. Martin heads the "conservatives," Frankensteen the "liberals" and Walter Reuther the "radicals." Most of the "wise" money is being bet on the middle group. The split has encouraged more radical locals to "start something." Example—at Kelsey-Hayes shop stewards attempted to eject from one department workers who had not paid their union dues. The stewards were fired, but may not stay fired.

At Flint the labor situation still seethes. A fresh cause for argument is the retention in recent General Motors layoffs of so-called "key men" (mostly non-union) in preference to men of longer seniority. Such retention is specified in the union contract. A strike on this issue now would be futile, as Martin realizes, because the industry would just as soon shut down today as 30 days from now in view of lagging retail sales. Martin, on the other hand, wants to retain the allegiance of Flint locals which are chafing for action.

With working forces under 40 per cent of normal in automotive plants, it is galling to union leaders to see non-union men of high efficiency rating retained at the expense of union men. The proportion of non-union men today is large in G.M. factories, the number being augmented by shifting of foremen and "straw bosses" onto production jobs. It is believed that a strike would be difficult to call except by mass picketing during changes in shifts. Union shop stewards are trying to stave off further layoffs in some plants by slowing down production.

LATE *NEWS* WIRES

NEW YORK—Orders for machine tools expected to be placed soon in this country by Manchukuo railroads for their maintenance shops. Russia has awarded equipment contracts to Cincinnati and New England companies and still has $15,000,000 of orders pending in the United States.

PITTSBURGH—Official statement regarding proposed merger of Allegheny Steel Co. and Ludlum Steel Co. expected later in week. Court has extended to Aug. 5 the time for confirmation for reorganization of Follansbee Brothers.

BOSTON—Boston Elevated Railway preparing foundations for million dollar shops at Everett. Will buy machine tool equipment in fall.

INDIANAPOLIS—Stewart-Warner reported to have purchased Marmon plant here and will rehabilitate and tool it for manufacture of household appliances.

CHICAGO—Lake County Council representing five independent unions, American Steel & Wire, Johnson Motor, Fansteel, Sager Lock and Automotive Maintenance Machine are demanding removal of members of National Labor Relations Board. Threatened strike of Allen-Bradley workers at Milwaukee averted.

WASHINGTON—Educational orders legislation, defeated as rider on Navy expansion bill, again up for consideration, this time in Senate. Chances for success seem small.

DETROIT—Homer Martin has retained control of U.A.W. executive committee by vote of 14 to 10 and chances of ousting him now seem slim. Ford reported to have cancelled large amount of equipment ordered recently, paying companies involved for work done thus far. Auto makers not disturbed over competitive threat of small car reputed to be made by Crosley Radio and sold for $250.

Fifty-Five Firms Represented At Third Machine Tool Forum

EAST PITTSBURGH—More than 90 delegates, representing 55 companies, attended the third annual machine tool electrification forum sponsored by Westinghouse Electric & Mfg. Co. at its East Pittsburgh Works, May 9–11. More than half of those present ha dattended the two previous forums, evidencing continued interest in these round-table discussions of motor and control application problems. Steel and rubber goods manufacturers and the United States navy were also represented.

Howard W. Dunbar, president of the National Machine Tool Builders Association and manager of the machining divison, Norton Co., attended and spoke briefly on the continued need for cooperation between the manufacturer of electrical equipment and the machine tool builders, at the Tuesday afternoon session.

Talks by representatives of several machine tool builders and by Westinghouse factory and field engineers covered specific applications of electrical equipment to machine tools and new design trends. Typical of these talks was one describing the evolution of planer drives by J. E. Doran, sales manager, The G. A. Gray Co. He included a discussion of the relative merits of constant- and variable-voltage drives for modern planers.

R. S. Elberty, now electrical engineer with the Landis Tool Co., and originator of the forum while employed by Westinghouse, discussed the use of built-in electrical control as an integral part of the machine. He outlined the practice of his company in applying control equipment and pointed out the desirability of electrifying the machine tool while it still is in the design stage. Improvements in punches, shears and bending rolls made possible by development of proper electrical apparatus were described by W. C. Tucker, assistant chief engineer of the machine tool division, Buffalo Forge Co. A. H. Platt, electrical engineer, Bullard Co., told of the use of graphic wattmeters in building machine tools.

An unusual planer-shaper for machining propeller blades was described by H. Earl Morton, president, Morton Mfg. Co., and O. G. Rutemiller, Westinghouse engineer. Operation of this machine was compared to the cutting of screw threads having a 20 ft. pitch.

Among those present were: Tell Berna, general manager of the National Machine Tool Builders Association; N. D. MacLeod, president Abrasive Machine Tool Co.; K. F. Gallimore, vice-president, Giddings & Lewis Machine Tool Co.; George E. Hallenbeck, vice-president and general manager, Baker Brothers; H. Earl Morton, president, Morton Mfg. Co.; G. K. McKee, asst. general manager, the Avey Drilling Machine Co.; L. Lee Schauer, chief engineer, the Cincinnati Bickford Tool Co.; Waldo J. Guild, consulting engineer, the Heald Machine Co., M. A. Hollengreen, asst. general manager, Landis Tool Co. and R. S. Pyne, chief engineer, Van Norman Machine Tool Co., and Carl G. Flygare, design engineer, Norton Co.

W. D. Turnbull, manager, Machinery Electrification Section, Westinghouse. Tell Berna, manager of the National Machine Tool Builders Association, with K. D. Jacobs, manufacturing cost analyst, Westinghouse motor division, and H. Earl Morton, president of Morton Mfg. Co. Howard W. Dunbar, president of the N.M.T.B.A. J. E. Doran, sales manager, G. A. Gray Co. C. W. Heppenstall, general manager, Heppenstall Co.

Harry A. Moore, general sales manager, Foster Machine Co., with G. H. Matthews, sales manager, Mattison Machine Works. E. E. Opel, electrical engineer, National Automatic Tool Co. M. A. Hollengreen, assistant general manager, and R. S. Elberty, electrical engineer, both of the Landis Tool Co. Bernard Lester welcomed the delegates to the machine tool electrification forum

Secretary Johnson Urges Tool Builders To Support Educational Order Bill

CHICAGO—Gathering at the Edgewater Beach Hotel on May 2 and 3 in what turned out to be a record semi-annual convention, members of the National Machine Tool Builders' Association were urged by Assistant Secretary of War Louis Johnson to get behind the bill authorizing educational munition orders.

In his address Secretary Johnson also said:

"We have made a survey of the arsenals of the United States and have concluded that even if we equip them with the best of modern machinery and staff them to capacity, they will be unable to produce more than 10 per cent of the Army's requirements in time of war. The function of the arsenals is rightly that of experimental laboratories rather than munitions factories. For the other 90 per cent of our munitions needs in an emergency, we will have to turn to civilian production.

"We have made a survey of American industry and are greatly encouraged by our findings. We feel that with proper education industry can carry a major war load and take care of our civilian as well as our military needs in time of emergency. As a result of our studies we have earmarked 10,000 plants for war production. We have informed their managers and their proprietors as to the tasks to be imposed upon them in the event of war. All of them have expressed their ability to meet that task.

"As encouragement to production, the War Department should have authority to place in peace time what are technically known as 'educational orders' with those plants which must have such aids as gauges, tools, dies and fixtures before they can perform their war tasks. The orders will be small but the experience gained will enable a factory to produce in quantity when the needs arise.

"I am happy to report that legislation granting this authority is now before Congress and the House Committee has acted upon it favorably. Its passage at this session is highly desirable."

President Howard W. Dunbar took "A long look ahead" in his address. Speaking of the business outlook he said:

"Never before in a business recession have so many of the fundamentals conducive to good business been in evidence. Banks are bulging with money. Credit is easy. There is a tremendous dormant demand for machine tools, and all products of American industry. The people want to buy.

"In our field replacement and natural expansion are the motivating factors. A recent survey by the *American Machinist* shows but a very slight change in the percentage of machines over ten years old as compared with the original survey made a few years ago.

"The only way we can maintain our present high standard of living is by steady growth in the use of machine tools; for it is an axiom that the only way in which our standards of living can rise is by an increase in production, resulting in an increase in consumption of the products of industry.

"Fear is to my mind the greatest influencing factor in the present recession. Business doesn't like to admit it is afraid, but certainly this fear does exist. It has killed initiative, caused capital to draw its neck in. Not until confidence is restored and faith established can business go forward.

"There are certain dependable barometers which seem to point to the fact that we have reached the low level and the next turn will be an upward one. I venture to predict that in a very short period we will see improvement in our industry. We cannot succeed or prosper unless the capital goods industry prospers. All these things await an increase in the national income.

General manager Tell Berna assured the members that their letters to Congressmen are read and urged them to continue this practice. He observed that: "We cannot fail to note the persistence of efforts to inflict further penalties on business, as witness the Sumner Bill to prevent issuance of patents on labor-saving devices, and the more recent Wagner Bill to make the certifications of the National Labor Board a part of Government contracts. Failure to comply means cancellations of the contract and payment of the cost to the Government of placing the order with the next higher bidder.

"Another instance is the McFarlane Bill for compulsory issuance of license to manufacture under a patent when it is over three years old."

W. J. Cameron to Address Machine Tool Dealers

DETROIT—Why "Machines Create Employment" will be taken as his topic by W. J. Cameron, spokesman of the Ford Motor Co., in addressing the banquet of the Associated Machine Tool Dealers of America, during their spring meeting at the Dearborn Inn, Dearborn, Mich., May 23-24. Representatives of other large automobile manufacturers will also be on the program.

President A. G. Bryant will open the convention on Monday morning, and then introduce Henry G. Weaver, director, Customers' Research Division, General Motors Corp., who will speak on "Is the Customer Always Right?." Of real interest to members will be the sales clinic to follow. On Tuesday David A. Wallace, president of the Chrysler Division, Chrysler Corp., will talk on "What the Machine Tool Buyer Wants to Know from the Machine Tool Seller."

Conditions in the European machine tool industry will be reported on Monday by E. H. Jones of E. H. Jones Machine Tools, Ltd., London, and a member of the executive committee of the Machine Tool Trade Association of Great Britain, and on Tuesday by Hugo D. Stokvis, president of R. S. Stokvis & Zonen, Rotterdam, Holland.

Machine Tool Orders Drop 15.6 Per Cent

Index of Machine Tool Orders

Based on Volume of Shipments for 1926

Month	Index of Orders: Domestic	Index of Orders: Foreign	Index of Orders: Total	3 Months' Average Index	% Foreign to Total Orders
1937 — March	172.1	39.5	211.6	192.4	19
April	232.5	50.0	282.5	219.8	17
May	161.4	47.1	208.5	234.2	23
June	137.6	54.2	191.8	227.6	28
July	115.4	55.7	171.1	190.5	33
August	129.5	50.3	179.8	180.9	28
September	119.0	91.7	210.7	187.2	44
October	89.1	62.9	152.0	180.8	41
November	63.3	64.4	127.7	163.5	50
December	53.5	89.2	142.7	140.8	63
1938 — January	43.2	75.2	118.4	129.6	63
February	48.7	27.0	75.7	112.3	35
March	50.5	56.5	107.0	100.4	52
April	43.9	46.4	90.3	91.0	51

DETROIT LETTER

Factories plan prolonged shutdown to give dealers chance to liquidate large stocks of cars . . . Production this year is estimated at 2,100,000 cars . . . 1939 show unchanged from Nov. 11 . . . Ford proceeding with construction program at Rouge

BURNHAM FINNEY
Editor, American Machinist

DETROIT—Gloom still blankets the automotive country. Despite assemblies of only 906,769 cars and trucks in the first four months of 1938 or 48 per cent of the total in the same period a year ago, dealers' showrooms and lots are bulging with new and used cars estimated at a 90-days' supply. That fact explains why factories will be closed for at least six to eight weeks this summer and why assembly plants may be idle even longer. Dealers must have a chance to liquidate their stocks before 1939 models come onto the market.

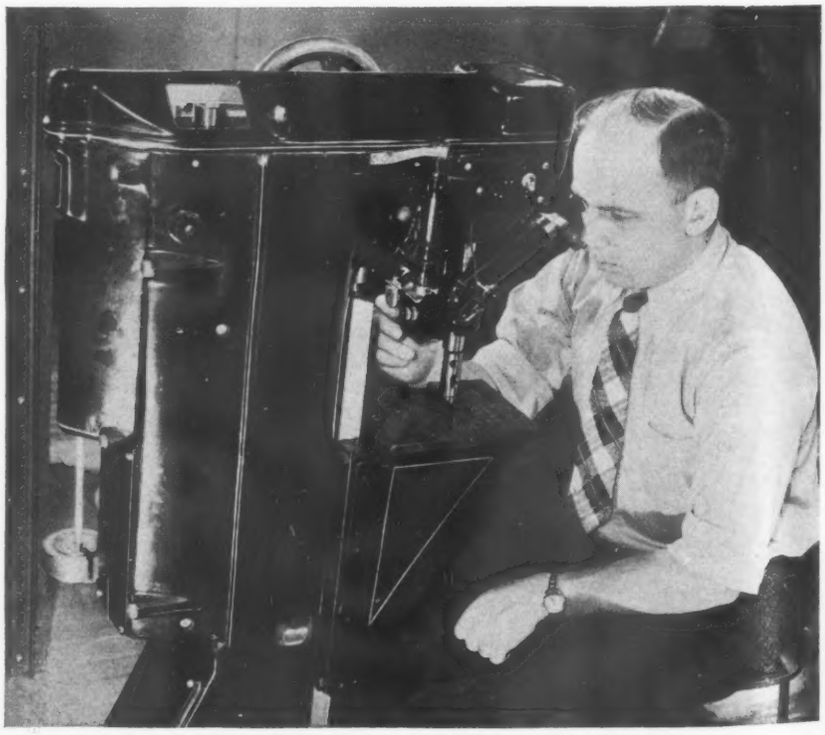
It appears that the industry will be doing well if it produces more than about 2,100,000 units during 1938. In each of the last three years assemblies from May 1 to Dec. 31 have constituted from 61.5 to 65 per cent of the year's output. If production should stay within the same range this year, the total for the calendar year would be around 2,300,000 units. But plans of leading companies indicate that assemblies during the third quarter will be pitifully small compared with last year when 861,973 units were turned out in the two months of July and August. Moreover, there is not going to be a rush in the Fall to stock dealers quickly. That means that fourth quarter operations won't be anything to shout about. So car makers may be lucky if they end up the year above the two million mark.

There are important problems to be straightened out before car production is shifted into high gear again. Not the least pressing problem is that of keeping those cars sold which already have been delivered to customers. Repossessions of cars sold on installment rose to a high point in February and declined in March and April, but threaten to mount again this month. Finance companies are doing everything that ingenuity can devise to avoid repossessions. They are refinancing cars on easier terms when the owner no longer can fulfill his original contract and even are holding cars for later redemption by the owner where payments cannot be met at present.

Though Detroit is in the dumps, one should remember that it can regain its full vigor faster than any other city in the country. Automobile sales decline more precipitately than the national income in a period of receding business, but also climb back to the heights more rapidly than national income in a time of expansion and recovery. Automotive leaders still are confident that their industry will lead the country back to better days just as it did in 1933 and 1934. But they aren't ready yet to "stick out their necks" by predicting when that drive will begin.

Despite the hullabaloo raised by dealers in behalf of a return to January new car introductions, there will be no change from the Nov. 11 date for 1939 models. Car manufacturers have no desire to bring the wrath of the White House upon them and the suggestion for the fall announcement plan came from the White House. Anyway, some companies believe that fall introductions help considerably to stabilize employment. There will be a concession to dealers, however, in that they will not have cars forced on them at the start of next winter and that entire lines of cars may not be revealed at the show, certain models being held back for announcement in January or later.

The present mood of the industry is to sit tight and make few changes for next year. Car companies complain that they haven't yet been able to pay for tools and dies for current models, hence they aren't inclined to plunge into heavy expenditures for 1939. That doesn't mean that there won't be any



Buick's new laboratories maintain accurate metallurgical control of all parts, materials and processes in the production of its cars, and at the same time carry on independent researches. Here is what is said to be the most accurate and efficient hardness tester in existence. Imported from England, the machine has microscope sights to measure the impression made by the diamond indentor in the metal's surface

changes at all. Chrysler is reported holding to its program for a switch to coil springs and to finger-tip control. But big capital outlays are banned. Another company which originally had fancy ideas of spending money for changes and improvements for '39 has limited its investment for a few changes, particularly in connection with springing, to $1,500,000.

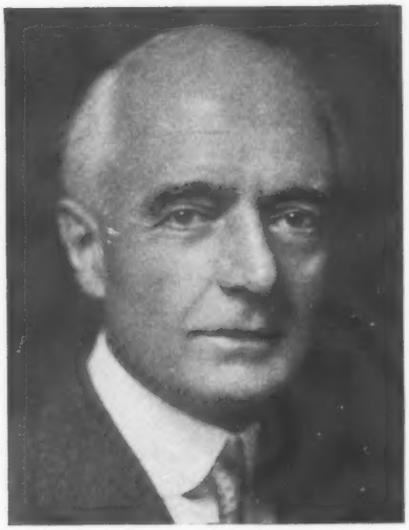
Ford's Rouge plant is a beehive of construction activity as new pressed steel and toolroom buildings rise. Building of a blast furnace has been deferred and a few other modifications have been made in the $40,000,000 expansion program, but otherwise the program is proceeding as scheduled. A large number of presses have been held up on orders from Ford, but it is understood that such orders will not be cancelled but will be released at a later date. Ford is still in the market for new machinery which will cut production costs and a number of deals on that basis are now up.

Most changes in 1939 cars will be in front-end appearance. There will be considerable copying of the Lincoln-Zephyr front-end styling and also of the Cadillac 60 Special which bears a close resemblance to the Cord front-end and which is low-hung and almost minus running boards. Typical of the flat condition of the equipment market locally is the absence of a single tooling program of consequence at the moment.

Metal-Trades Instructors Needed by New York State

New York—Skilled mechanics desiring to become vocational-school instructors in machine-shop practice and allied trades should apply to the Industrial Teacher Training Division, University of the State of New York, 80 Centre St., New York City, before August 15. Applicants need not be residents of the state. Nine years experience is required, five of these years in work beyond apprenticeship, plus one year of high school education. Applicants will be given trade tests and those who pass will then be given teacher training. In New York the trade teacher starts at $9. per day while serving on a permanent substitute license, and upon achieving a permanent license starts at a salary of $2,140 per year of ten months. Increase is at the rate of $175 per year, until a maximum of $4,500 per year is reached.

CHAS. E. VAN NORMAN



FRED D. VAN NORMAN

Van Norman Celebrates Half-Century Mark

SPRINGFIELD, MASS. — The forerunner of what is now the Van Norman Machine Tool Co. was organized as the Waltham Watch Tool Co. in 1888 and moved here in 1890. During the 50 years while the company was growing into a widely known supplier of machine tools and automotive repair equipment, Chas. E. Van Norman has been president. His brother, Fred D., started as secretary, and is now vice-president as well. James Y. Scott, who has been with the concern for 20 years, is executive vice-president, treasurer and general manager.

The Waltham Watch Tool Co. made watchmaker's lathes and instruments, and later expanded production to include millers, engraver's tools, molding dies and other specialties. In 1895 it produced the first milling machine having a pivotally adjustable cutter head. The first bore grinder was built in 1909, and a short time before the World War the company made its first radius grinder for ball bearings. About the same time the company went into production of a floor-type hand miller.

In 1912 the company was reorganized as the Van Norman Machine Tool Co. It had already felt the influence of the automobile industry, and was concentrating on development of two general classes of machines: machines for making jigs, dies and tools for the metal-working industry in general; and hundreds of items for the automobile repair shops. For example in 1923 it put out a self-contained motorized bore grinder with ball-bearing workhead and wheelhead spindles. In 1936 the whole line of milling machines was redesigned.

Business in all lines has been so great a sto require additional buildings, one of which was erected in 1937 and another this year. Last year was the biggest in the concern's history, sales being over $2,000,000.

Forrest Cardullo Dies

CINCINNATI—Forrest E. Cardullo, chief engineer of the G. A. Gray Co., planer builders, died May 7. Although known as a brilliant engineer and gear expert, Mr. Cardullo will be remembered by his friends and associates for his charity to others. His greatest achievement was a system of helical involute gearing for planers. Visitors to the last Machine Tool Show will remember the large combined planer, miller and boring machine in which he combined the most modern ideas in machine design.

WATCHING WASHINGTON

Strength of Wage-Hour Bill in House traceable to many factors, including favorable reaction by public . . . Shipbuilding program is step toward government ownership . . . No real Congressional opposition to pump priming can be found

McGRAW-HILL WASHINGTON BUREAU
(*Paul Wooton, Chief*)

WASHINGTON—Several factors contributed to the alacrity with which House members petitioned the Wage-Hour Bill away from the Rules Committee. President Roosevelt went into the ring for labor standards for the sixth time, and he still carries a wallop, despite his Gallup Poll rating. It has been increasingly evident that the public is for wage-hour control in principle. Elections of Lister Hill of Alabama on a wage-hour platform, and of Senator Claude Pepper of Florida, administration man, took some of the starch out of Southern opposition. John Lewis and William Green joined forces in support. And the bill carries no regional differential, which pleases the North. After the successful petition, Rules committeemen were in a quandary whether to submit to popular will and give the bill a rule, or save face and hold it till House rules take over automatically May 23. Preponderant opinion says the bill will pass the House. Its fate seems to rest on the will of Southern senators to filibuster in Washington's steamy heat. (Air conditioning won't be ready this summer.)

Government Ownership

The Maritime Commission's decision to "proceed at once" with its 24-ship, $100,000,000 shipbuilding program for Pacific Coast-foreign service lines is regarded as a definite step toward government ownership. Private capital stands aloof; the ships will be for government account and operation, or lease. Seven or eight of them will go on "round the world" routes and will serve incidentally between the East and West coasts via Panama. This is in effect a subsidy for intercoast shipping, and is a slap back at Congress, which refused authority for the Commission to aid domestic operations. Federal Shipbuilding and Sun Shipbuilding each were awarded four standard steel cargo ships at a cost of about $2,000,000 each. Pensacola Shipbuilding bid low on four other standard ships and will get the contract if it meets the competency requirements which must be made because the company is a new bidder.

Battleship Building

The conference committee is turning out the billion-dollar navy bill substantially as passed by House and Senate. One innocent-looking change cuts battleship tonnage down from 45,000 to 35,000, but says the President can order them bigger if he wants to. That actually removes any limit. The bill calls for three battleships, two aircraft carriers, $15,000,000 for "suicide" and other small craft, nine cruisers, 23 destroyers, nine submarines, 950 airplanes, and 26 auxiliaries (tenders, tankers, repair, tugs, etc.). The entire bill is merely an authorization; it carries no appropriation. But the bill starts us in a world navy race, and probably most of the stuff will be built.

Educational Orders

For a time after Representative Joseph Smith got his educational orders bill attached to the Navy expansion bill, there was hope the conference committee would approve it. But they threw it out under the old government fear of negotiated contracts. Mr. Smith will try to bring his amendment before the House again, but he holds little hope for it.

Industrial Loans

Feeling in Washington has crystalized on three points regarding RFC industrial loans. First, anybody who has collateral and the earning capacity to pay it back can get industrial long-term loans, either through RFC or from the banks. Second, such loans are not going to help the fellow who needs it because he hasn't enough collateral, and his ability to repay is doubtful. Third, so long as investors will not invest, and business is afraid to expand, loan money can help very little.

Chamber of Commerce

Washington concludes that the U. S. Chamber of Commerce made a weak stand for its principles. Executive Vice President John O'Leary's method of countering legislation through local organizations is believed to be partially effective. Undoubtedly local chambers strengthened business pressure which modified the tax bill. The Chamber reversed itself on reciprocal trade policy; now it's opposed. It seems to be weary of ineffective nagging at the New Deal. Critics say it must find a new way to dramatize an old protest.

Pump Priming

There never was any real opposition in Congress to the President's spending pump. Few congressmen believe the dole will have any lasting benefit for the country. Few business men, in Washington or elsewhere, believe so. But voters back home want the handout, and few congressmen can afford to oppose it.

Long and Short Haul

Long and short haul legislation was killed for this session when a House Interstate Commerce subcommittee refused to report it to the full committee.

MONOPOLY MANEUVERS

A new friendliness for the O'Mahoney-Borah federal incorporation bill is developing in the administration. Jerome Frank gave the first hint when he advocated it as protection for stockholders in cases involving reorganization of companies. It's more serious than that, however, as will become manifest next winter if the administration is as successful as it expects in electing New Dealers. Reasons privately expressed by New Dealers inside the big tent as to why the legislation is not pressed now are interesting. Says one of them, "The administration has met with several technical defeats on Capitol Hill recently. We think if the big fellows who want to crush competition should put the pressure on now for the bill, instead of opposing it as they have been doing, they might get a law as favorable as the corporation laws of Delaware or New Jersey. But if legislation is held off until next year, we may get a bill really calculated to smash monopoly."

ROBERT SHANNON

J. B. TYTUS

FRANK H. FANNING

PERSONALS

ROBERT SHANNON, vice-president and general manager of the RCA Manufacturing Co., has been made a member of the board of directors. Mr. Shannon, who is 46, has been identified with radio manufacture and administration since the earliest days of radio. In 1934 he was appointed manager of the Camden plant and was promoted to vice-president and general manager last year.

D. E. BATESOLE, formerly assistant chief engineer, is now chief engineer of the Norma-Hoffman Bearings Corp., Stamford, Conn., succeeding the late GEORGE R. BOTT. T. E. ROUNDS of the engineering department has been made assistant chief engineer.

LOTHAIR TEETOR, formerly vice-president, was made president and general manager, Perfect Circle Co., Hagerstown, Ind., to succeed his father, C. N. TEETOR who died last May. RALPH TEETOR was elected vice-president and head of the engineering division. L. B. DAVIS becomes secretary-treasurer and C. RAY TEETOR comptroller.

C. R. MCDONALD, vice-president in charge of manufacturing, International Harvester Co., has retired after 43 years of service and is succeeded by FOWLER MCCORMICK, second vice-president, who has been in charge of foreign sales.

A. C. DANEKIND, chairman of the General Electric Co.'s factory equipment and practice committee, has been made assistant to the vice-president N. B. BIRGE, with offices in Schenectady. In his new position, Mr. Danekind will work with companies affiliated with General Electric.

FRANK F. WISE has been appointed general manager of the Koppers Co. Western Gas Division, Fort Wayne, Ind., makers of valves, sluice gates and other equipment for waterworks and sewage disposal plants.

CHAS. M. POND, manager, small tool and gage department, Pratt & Whitney Co., sailed for England on May 18.

J. B. TYTUS has been elected vice-president in charge of operations of the American Rolling Mill Co., according to an announcement by Calvin Verity, executive vice-president. FRANK H. FANNING has been appointed assistant vice-president in charge of operations. Mr. Tytus was awarded the Gary medal by the American Iron & Steel Institute several years ago for his part in the development of the continuous rolling process in the manufacture of iron and steel sheets. Prior to his present assignment, Mr. Fanning was assistant to the executive vice-president.

ANDREW H. PHELPS has been appointed general manager of purchases and traffic for the Westinghouse Electric & Mfg. Co., according to an announcement by GEORGE M. BUCHER, president. T. J. PACE, formerly general manager of purchases and traffic, has been appointed assistant to the vice-president. Mr. Phelps went to Westinghouse in January, 1937, from the McGraw-Hill Publishing Co.

ANDREW H. PHELPS

Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn., has announced the following promotions: HAROLD D. FAIRWEATH, vice-president and treasurer, has been elected first vice-president to succeed the late first vice-president FREDERICK T. MOORE.

STEPHEN W. DIMMICK was elected vice-president of the small arms division and GEORGE R. PORTER was named vice-president of the Auto San division. Both were formerly managers of these divisions.

HARRY A. STEVENS was appointed works manager and CHARLES H. COLE was named assistant works manager in charge of the machine gun division. GEORGE WEBB becomes assistant works manager in charge of engineering.

DWIGHT G. PHELPS and BENJAMIN F. CONNER, divisional vice-presidents, were named vice-presidents. Mr. Phelps will head the electrical division and Mr. Conner the plastic division.

MILTON P. HIGGINS has been made resident manager of the Chippawa, Ontario, electric furnace plant of the Norton Co., Worcester, Mass. He succeeds the late JOHN B. GLAZE. Mr. Higgins has lately been manager of sales research. He is also a member of the board of directors.

J. F. ROCHE, JR., for the past three years manager, industrial division, Binks Mfg. Co., Chicago, has been appointed vice-president and elected a member of the board of directors.

WENDELL G. REYCROFT, sales manager and WALTER F. HEROLD, chief engineer of the Bassick Co., Bridgeport, Conn., have been elected vice-presidents of the company. Among officers reelected are: president and general manager, WILLIAM A. ROSE; vice-president and works manager, THOMAS T. LOGIE.

FREDERICK AYRES LORENZ, JR., vice-president of the American Steel Foundries, has been awarded the Joseph F. Seaman gold medal of the American Foundrymen's Association, in recognition of his leadership and accomplishments in the management and commercial phases of casting manufacture.

D. A. BARRETT

D. A. BARRETT, vice-president, Carnegie-Illinois Steel Corp., has assumed supervision of all industrial relations activities of the company, including personnel, training, labor relations, safety and welfare. Mr. Barrett has been vice-president of Carnegie-Illinois since June, 1936, prior to which he was vice-president in charge of operations of the former American Sheet & Tin Plate Co. Mr. Barrett has been with the U. S. Steel Corp. subsidiaries for 42 years.

ANDREW W. SODERBERG, chief engineer of the Homestead Works, Carnegie—Illinois Steel Co., will retire May 31, after completing 49 years of service with the company and its predecessor. Mr. Soderberg originated the "rocking shear" principle of cutting wide steel plate.

BUSINESS ITEMS

Micromatic Hone Corp. and Barnes Drill Co. will be mutually represented in the New England territory by F. A. PARKER, 20 Fern St., Auburndale, Mass. Mr. Parker succeeds to the territory formerly held by ARTHUR S. PIERCE, Melrose, Mass., deceased.

Esco Engineering & Sales, Inc., distributors of drill jigs, has appointed the following sales agents and distributors: CONRAD O. HERSAM, Industrial Consulting Engineering Co., 1761 St. Paul St., Philadelphia, will sell drill jigs and fixtures in lower New York State, Delaware, Maryland, New Jersey and Eastern Pennsylvania. HAL REYNOLDS, 3346 Superior St., Cleveland, Ohio, representative for Taft-Peirce,, Colonial Broach and various kindred products, will sell and represent Esco in Ohio.

The Vascoloy-Ramet Corp., North Chicago, Ill., has announced the following additions to its sales engineering staff: GEORGE M. MENCKE, now sales manager, and formerly with Thomas Prosser & Sons and the Carboloy Co.; JAMES A. FRASER, assistant sales manager, formerly with the Vanadium-Alloys Steel Co.; A. M. KEBE, district manager of the Cleveland territory; C. M. GRANNIS, district manager of the Detroit territory; C. W. BLADE, district sales manager of the New England territory; WALTER J. DENNIS, die sales engineer in the Western territory with headquarters at Chicago; M. W. DENNIS, JR., die sales engineer in the Eastern territory with headquarters at Pittsburgh, and S. A. MINIEA, sales engineer in the Chicago territory.

The Union Metal Mfg Co., Canton, Ohio, recently purchased the Burton Mfg. Co., formerly at Michigan City, Ind., manufacturers of seamless steel structural tubing. The entire stock and equipment of Burton has been transferred to Canton. E. B. ROGERS, president of Burton, formerly superintendent of Mid-West Forging Co., Chicago, is now associated with Union Metal in charge of tubing operations.

The James Coulter Machine Co. has opened a new plant at 386-404 Mountain Grove St., Bridgeport, Conn., where it will specialize in the design and construction of special automatic machinery. The company is the originator of the automatic threading lathe, automatic hob thread miller, shaping planer, vertical and horizontal profilers and the precision boring machine.

The Hisey-Wolf Machine Co. has appointed J .F. GRUBER, 528 East Montana St., Milwaukee, as factory representative in Wisconsin.

The Maritime Transport Co., 25 Broad St., New York, N. Y., in 1937 set up a service to assist domestic manufacturers in securing best possible foreign distributors for their products. Now they have contacts with 187 cooperating freight forwarders located in the principal marketing centers of the world, and each will locate distributors or dealers qualified to handle marketable products.

Westinghouse Electric & Mfg. Co. is centralizing the manufacture and sales of its "Precipitron" in its Cleveland, Ohio division. F. B. KOHNSTAMM, manager of the Cleveland Division, which produces all Westinghouse lighting equipment, will supervise activities in connection with this newest air cleaning development. He announced the appointment of GEORGE F. BEGOON as sales manager.

Westinghouse Electric & Mfg. Co., recently broke ground at East Springfield, Mass., for a new plant to manufacture beverage coolers, water coolers and commercial refrigerators. The manufacturing building will be 942 ft. long by 170 ft. wide and the warehouse building 382 ft. long by 232 ft. wide. Springfield's Mayor ROGER L. PUTNAM, president of the Package Machinery Co., lifted the first power shovelful of earth.

Pangborn Corp. has removed its New England office to 175 State St., Springfield, Mass. It will be in charge of J. H. CONNOLLY, previously connected with the Company's Detroit office.

The Allis-Chalmers Mfg. Co. has appointed WILLIAM ARTHUR as its Philadelphia district office manager to succeed the late J. E. WRAY. Mr. Arthur has been the company's special representative for railway traction and mercury arc rectifiers in the east, attached to the New York and Philadelphia offices.

Lynd-Farquhar Co. has moved its office to Park Square Bldg., Boston, Mass

The Reliance Electric & Engineering Co., Cleveland, has moved its New York office to 110 East 42nd St.; the Pittsburgh office to 355 Fifth Ave.

OBITUARIES

WILLIAM H. SMITH, metallurgist and production engineer in the automotive field, died May 2 at the age of 65. Mr. Smith, president of General Reduction Corp., chemical engineers, was associated at one time with JOHN R. LEE as joint owner of the Keim Mills, Buffalo, makers of pressed steel parts. From 1928 to 1932 he was research metallurgist for the University of Detroit.

HERBERT L. MERRICK, founder and president of the Merrick Scale Mfg. Co., Passaic, N. J., died May 2, at the age of 65.

CHARLES F. MICHAEL, 63, founder of the Ohio Locomotive Crane Co., Bucyrus, O., of which he became president, and founder also of the Sozonian Vault Co., died May 4.

MEETINGS

AMERICAN ELECTRO PLATERS' SOCIETY. 1938 convention, June 13–17. Hotel Schroeder, Milwaukee. W. J. R. KENNEDY, executive secretary, 90 Maynard St., Springfield, Mass.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Summer convention, June 20–24. Washington, D. C. H. H. HENLINE, national secretary, 33 West 39th St., New York, N. Y.

AMERICAN IRON & STEEL INSTITUTE. Annual meeting, May 26. New York.

AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, June 27-July 1. Chalfonte-Haddon Hall, Atlantic City, N. J.

NATIONAL ASSOCIATION OF PURCHASING AGENTS. Twenty-third annual international convention, May 23–26. Jefferson Hotel, St. Louis, Mo.

NATIONAL METAL TRADES ASSOCIATION. Fortieth annual convention, May 25–26. The Biltmore Hotel, New York, N. Y. HARRY S. FLYNN, secretary, Peoples Gas Bldg., Chicago, Ill.

SOCIETY OF AUTOMOTIVE ENGINEERS. Summer meeting, June 12–17. The Greenbrier Hotel, White Sulphur Springs, W. Va. JOHN A. C. WARNER, secretary and general manager, 29 West 39th St., New York, N. Y.

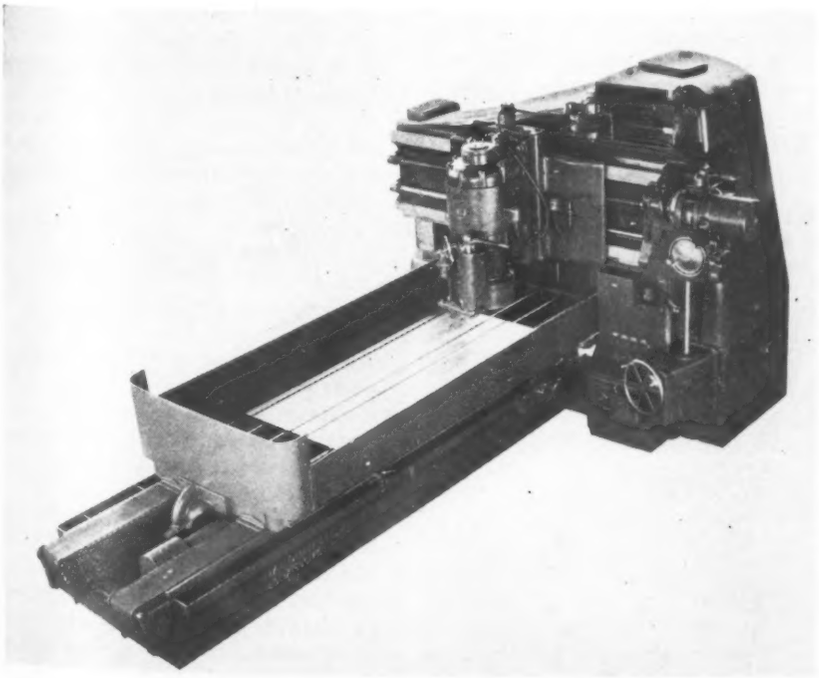
SHOP EQUIPMENT NEWS

Hanchett Vertical Spindle Planer-Type Surface Grinder

Speeds up to 60 ft. per min. can be obtained on this larger vertical-spindle planer-type surface grinder offered by Hanchett Mfg. Co., Big Rapids, Mich. The finished top of the work table measures 50 x 120 in. and the distance to the table top under a new wheel is 20 in. Forced feed lubrication is provided for the ways of the work table.

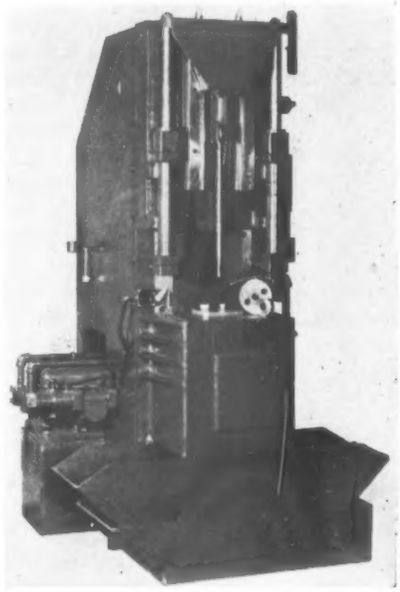
A segmental type, 18-in. diameter grinding wheel is used; this wheel being 6 in. high and having a 1½-in. face. Power elevation is provided for the cross rail at the rate of 3 ft. per min. Automatic clamping is provided on both housings for the cross rail. Automatic down feed in increments of 0.002 to 0.003 in. is provided for the wheel head. Automatic cross feed is in steps of ⅛ to 5-in. Constant cross feed is at the rate of 30 ft. per min.

A welded boiler-plate tank having a capacity of 300 gal. is provided for the coolant. The coolant system includes a pump driven by a ¾-hp., 1800-r.p.m. motor. A 25 hp., 900 r.p.m. motor drives the grinding wheel while a 15-hp., 1200-r.p.m. motor is required for the hydraulic pump. A separate 5-hp. motor provides cross feed for the grinding wheel head while another motor of 10-hp. capacity elevates the cross rail assembly. A ¼-hp. motor driven pump is used for the forced feed lubrication. Net weight of the machine is 85,000 lb. and it measures approximately 160 in. wide, 350 in. long and 120 in. high.



Oilgear Vertical Broaching Machine

Holes in crank shaft and cam shaft timing gears are broached to size within a tolerance of plus or minus 0.0005 in. at the rate of 270 gears per hr. in this 6-ton, vertical pull-down broaching machine furnished by the Oilgear Co., 1319 W. Bruce St., Milwaukee, Wis. Loading level



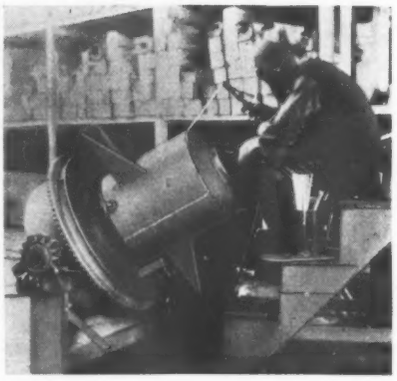
of this machine is stationary and the tool handling slide is hydraulically operated. Tool is supported at both ends for the first portion of the stroke and continuous lubrication of tool and work is provided. Operator merely lays the work flat on the platen, presses a pushbutton and the tool slide moves down so that the tool shank threads through the work and enters the pulling socket under the platen. Main slide and automatic puller draw the tool downward to broach the part and then automatically stop. Operator can start, stop or reverse the tool and main slides at will.

This machine is so designed that the main slide can be used for surface broaching operations. Tools can be fixed to the main slide and the necessary fixture mounted on the stationary platen. Cams on both slides can be adjusted to suit the stroke required. An Oilgear Type DH-1211 two-way variable delivery pump supplies power for operation of both slides. Cutting and return speeds to the main slide can be adjusted independently. Specifications; normal capacity, 12,000 lb.; peak capacity, 18,000 lb.; maximum stroke, 24 in.; cutting speed, 4-35 ft. per min.; maximum return speed, 60 ft. per min.; tool handling

cylinder speed, 50 ft. per min.; height of platen above floor, 43 in.; over-all height, 98 in.; floor space required, 58 x 56 in.; net weight, 7,000 lb.

Ransome Revolving Welding Fixture

Table of the revolving welding fixture developed by Ransome Concrete Machinery Co., Dunellen, N. J., can be tilted to a vertical position on either side of the center line and, in this position, will carry a load of 600 lb. with a maximum diameter of 24 in. Work of larger diameter can be carried in the vertical position only on one side of the center. Table is 31 in. in diameter, and 25 in. high when horizontal. It has eight lines of radial slots for bolts to hold the work. This table is driven by a ¼ hp. motor through a variable



speed transmission and worm gear reducer. Range of table speeds from 0.055 to 0.333 r.p.m. correspond to welding speeds of 0.43 to 2.6 ft. per min. on a 30-in. diameter. Speed is adjusted by hand wheel on one side of the housing. Drive is reversible. Table is titled by a hand-operated, self-locking worm and wheel.

Landmaco Four-Spindle Threader

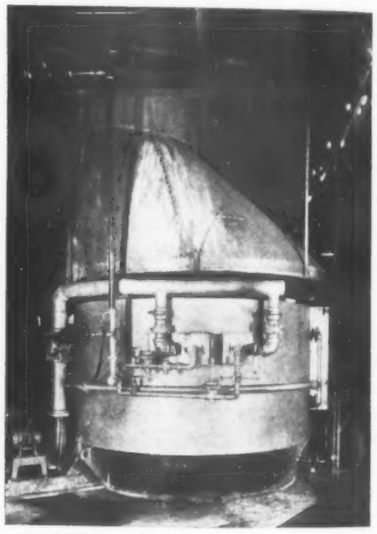
Four threading units assembled on a single bed structure comprise the Landmaco quadruple head threading machine announced by Landis Machine Co. Inc., Waynesboro, Pa. This machine has the mechanical features found on other Landmaco threading machines, with the added feature of being particularly adaptable to jobbing and maintenance work where it may be desirable to set each die head on a separate diameter, thus eliminating the necessity for changing the chasers frequently.

This threading machine is equipped with a selective-type gear box which provides eight threading speeds. The gears are cut from chrome-nickel steel and are hardened and burnished to insure smoothness of operation. Anti-friction bearings are employed throughout for all gear shafts. Main spindle is driven by a spiral bevel gear and is mounted on a pre-loaded anti-friction bearing at the die head end. Guides are covered by telescoping steel guards which protect them from chips.

Provision is made to equip the left-hand spindle with the Landis reverse taper die head, which is designed especially for threading taper head radial crown bolts. Distances between die heads are the same as on the standard double-head machine. Since the center to center measurements are short, one-man can operate the four die heads.

G.M. Rotary-Hearth Forging Furnaces

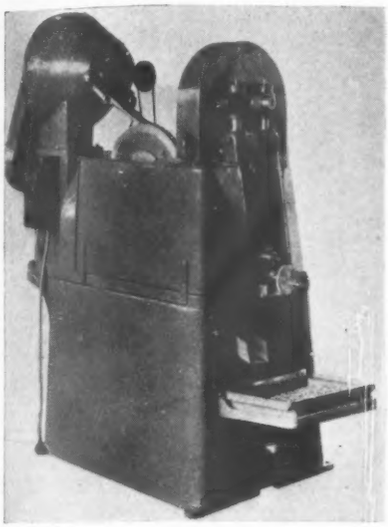
A design of water-sealed hearth rotary forge furnace which makes slag removal from the hearth a comparatively simple procedure has been announced by the Gas Machinery Co., 16100 Waterloo Rd., Cleveland, Ohio. Clearance space between the rotating hearth and the stationary side wall is quickly adjustable from outside the furnace, permitting the furnace quickly to be replaced into production in the event of slag accumulation and freeze up between these refractory surfaces. As the molten slag forms in sufficient quantity on the hearth, it will over-



flow the sloping sides of the table and collect in the water trough where it is quenched and shattered. It is removed from the trough continuously by a slag plow or periodically as required. These furnaces include the standard water seal and syphon vents previously described (*AM*—Vol. 81, page 1002).

Lindgren Automatic Screw-Head Slotter

Arranged for slotting brass binding post screws, which are hopper fed, clamped, slotted and ejected automatically at a high rate, this special machine developed by Lindgren & Son Mfg. Co., 751 Central Ave., Bridgeport, Conn., is arranged with a ⅝-in. wide band saw which is claimed to give long cutting service. Saw band is 82 in. long. Method of slotting the screws in this machine maintains the outside radius of the 14-in. diameter work carrier



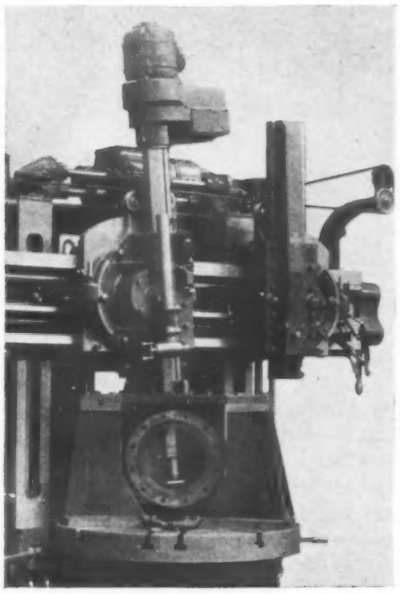
in the bottom of the screw slot, thereby making it practically flat.

Screws automatically are fed from the hopper into a chute, then transferred into a continuously revolving work carrier. Here, they are clamped automatically and passed by the band saw which cuts the slot. Following this, the parts are unclamped and ejected into a work pan outside the machine. Adjustment of the work carrier is possible in order to allow for slotting different size screws; extra work carriers can be funished to handle a lager variety of different sizes. This machine is driven by a 1-hp. motor and coolant is supplied to the saw through a gear driven pump from the coolant tank in the base of the machine. Necessary adjustments for depth of slot, center and clamping are provided.

Cincinnati Two-Speed Grinding Attachment

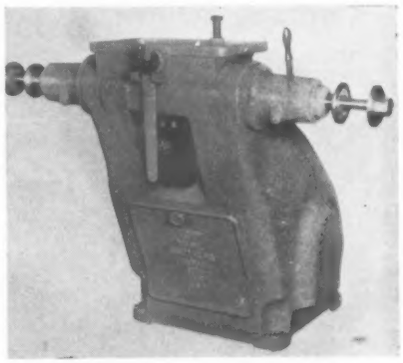
A self-contained grinding attachment has been developed by the Cincinnati Planer Co., Cincinnati, Ohio, for mounting on the cross rail of a standard boring mill. This attachment is arranged to replace the standard left-hand head usually furnished with such mills. Drive to the grinding wheel is through a two-speed box upon which the motor is mounted. The hollow octagon ram is fitted with precision bearings to support the drive shaft which holds the grinder quill at its lower end. Quills varying both in length and diameter can be furnished.

Mounted rigidly on the swivel head is a hand-operated truing device which has adjustment for both height and wheel diameter. Both feed and rapid traverse movement are provided for all positions of the wheel. Vertical feed of the grinding wheel is controlled through dogs mounted on the ram, permitting cuts to be made automatically in both directions. At the upper end of the stroke, another dog operating through a limit switch imparts a horizontal feed movement varying from 0.005 to 0.004 in. This horizontal feed can be disengaged.



Divine Improved Polishing Lathes

Improved V-belt driven buffing and polishing lathes have been announced by Divine Brothers Co., Utica, N. Y. Available in 3, 5, 7½



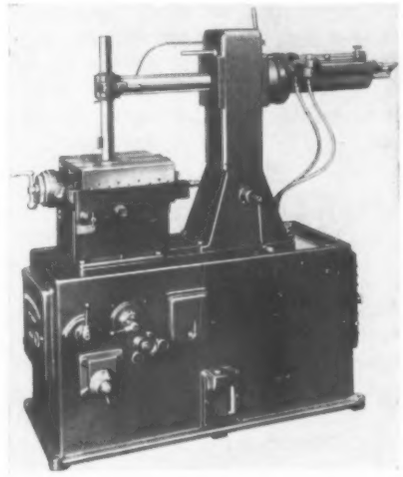
and 10 hp. sizes, these lathes provide spindle speeds ranging from 1,800 to 3,600 r.p.m. Overhang is 12 in. A combination start-stop-and-brake lever is now provided. V-belts can be changed without removing the spindle or disturbing the spindle bearings. Belt adjustment is by means of a wheel at the rear of the machine.

Nixon Hydraulic Vertical Shaper

Vertical broaching, vertical shaping, keyway cutting and saw broaching operations can be performed on the hydraulic multi-purpose vertical shaper and keyseater announced by the Nixon Gear & Machine Co., Inc., Syracuse, N. Y. The cutter bar of this machine is moved vertically by a hydraulic cylinder located under the bar, thereby providing a straight pull. Length and placement of the stroke is controlled by two stops located on a dial on the outside of the machine. Stroke can be reversed easily at any part of the stroke by means of a lever near this dial. Speed of the down or cutting stroke can be varied to suit conditions, but the return stroke remains constant.

Work table has T-slots for holding fixtures or work. On the up stroke the table pulls away from the bar, allowing the cutter to leave the cut completely. This relief can be adjusted up to $\frac{9}{16}$ in. It is operated hydraulically and synchronized with the bar movement. Table can be tilted by worm gear 5 deg. each way from level for cutting taper keyways. A large diameter dial, reading in thousandths, is provided with a positive depth stop. Hydraulic feed to the table is optional and an adjustable automatic feed of from 0.002 to 0.015 in. per cut is available. A 5 hp. motor drives the pump.

There are two sizes of this ma-



chine, the No. 3 unit having a stroke of 6 in. and a table travel of 1 in. The No. 4 unit has a 12-in. stroke and a table travel of 2 in. Capacity for cutting keyways in steel is 1 in. for both units. Distance from center of bar to column is 17 in. for both units, while height of table from floor is 40 in. for the small machine and 44 in. for the large.

Miller-Strobel Electric Arc Saw

Made in a range of models to handle different types of work, the Miller-Strobel electric arc saw offered by Miller Electric Mfg. Co., Appleton, Wis., is claimed to cut with equal efficiency, economy and speed regardless of the hardness of the metal. Cuts are made by means of a controlled electric arc that is in advance of the saw and brings the metal along the kerf lines to a plastic condition. The saw blade functions only to sweep the molten metal from between the kerf lines and as electrode from which the heat generating arc jumps to the work. The blade itself does no cutting and is of a soft alloy metal. Side arcing is claimed to be eliminated and the arc is claimed to travel in a path only a few thousands of an inch wider than the width of the blade. A specially built welding transformer is provided to generate the arc.

Taber Model V-5 Stiffness Gage

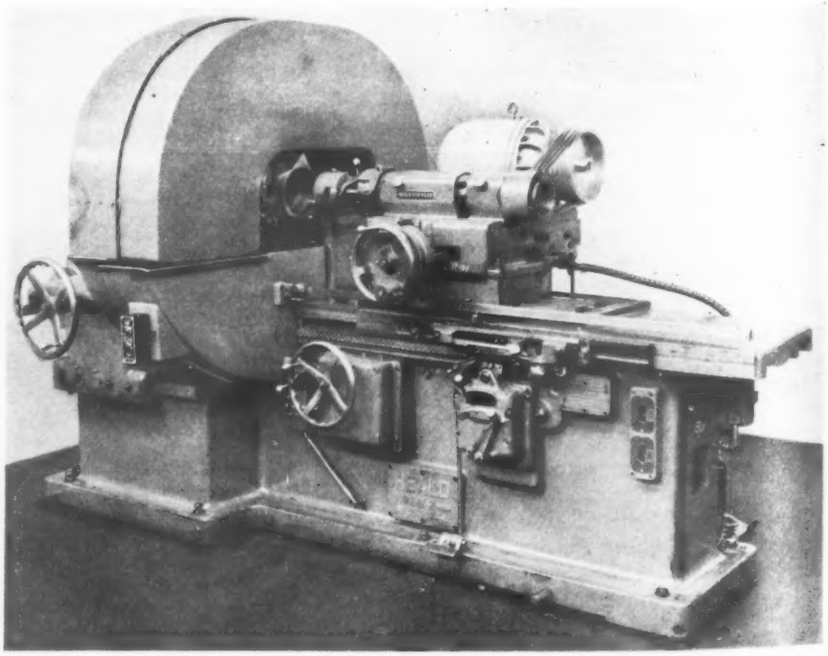
Accurate measurement of the stiffness and resilient qualities of paper, coated fabrics, light metallic sheet and wire is said to be possible with the portable Model V-5 stiffness gage offered by Taber Instrument Co., North Tonawanda, N. Y. Metric calibration provides a continuous scale from zero to 2,000 gram centimeters. There are no delicate parts, electrical contacts or connections and the sensitive bearings are sealed in lubricant. A triple-cut shear is provided to blank out test specimens to accurate size, insuring against dimensional errors. Weighing system of this gage is of the pendulum type, the entire pendulum assembly with the exception of the calibration weight being made of aluminum alloy, thereby keeping inertia and bearing friction to a minimum.

Heald No. 174 Adjustable-Gap Internal Grinding Machine

Work requiring a swing up to 42 in. in diameter and having holes up to 20 in. in diameter can be internally ground on the No. 174 adjustable-gap internal grinder, announced by The Heald Machine Co., Worcester, Mass. Pushbutton control switches for the wheelhead and back shaft motors are built into the right end of the base, within convenient reach of the operator. Main table travels on flat and V ways, which are protected at all times against grit and dirt by two stationary steel shields which cover the ways in all positions of the table. Table is driven by a simple hydraulic arrangement which allows for complete control of speeds or direction of movement. With this drive, there is an arrangement for quick withdrawal and return of the table from and to the work. Stroke of table is controlled by three adjustable dogs.

Table speeds are controlled by a throttle and can be varied from 0 to 32 ft. per min. A 12-in. diameter flange on the front end of the spindle gives support for chucks and fixtures. Workhead is mounted on a bridge which rests on two scraped ways at the end of the base. Work guard is adjustable to various lengths of workpieces and is opened and closed hydraulically. The guard swings back to permit loading by a crane. A hole through the spindle provides for a collet operating tube which can be adapted for collets or special holding fixtures. The gap or swing clearance for the work can be adjusted by lateral movement of the bridge and workhead unit on the ways.

Wheelhead is connected by flexible coupling to an intermediate



Here's Why the New T-15 "Buffalo" Tapper Produces More Pieces Per Hour

If you want to put your tapping on a real production basis, write today for Bulletin 3064-A on the Buffalo T-15 Tapping Machine.

1. It includes all the time-tested sturdiness and accuracy of the Buffalo No. 15 Drill.
2. Four ball bearings in pulley and sleeve.
3. Full power V-belt drive.
4. Has depth stop for bottom tapping.
5. Has full ball bearing tapper rigidly locked in spindle.
6. Has sight feed oil valve supply to tapper.
7. The stripper is adjustable to all work.
8. All wearing parts are either bronze-bushed or hardened steel.

BUFFALO FORGE COMPANY, 448 Broadway, Buffalo, N. Y.

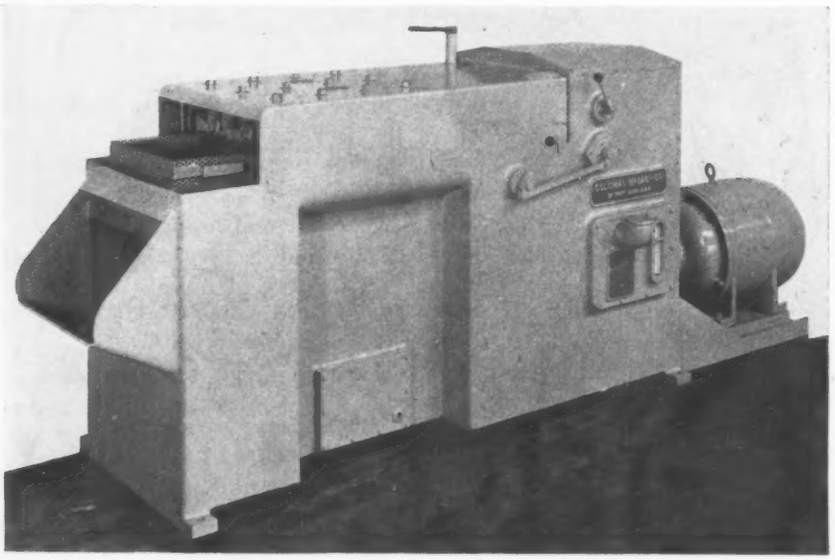
Branch Engineering Offices in Principal Cities In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Manufacturers of Precision Tools for Over Half a Century

jackshaft which is belted to the wheelhead motor. This construction is claimed to eliminate chatter caused by belt pulsations from the wheelhead spindle. Hydraulic pump is of the gear-type design, built for high pressure duty and is connected by a flexible coupling to its own motor. Oil in the hydraulic system is kept clean by being passed through a filter. Specifications: size of base, 115 x 36½ in.; floor space with water tank, 150 x 66 in.; swing inside standard water guard, 42 in.; maximum diameter of hole that can be ground, 20 in.; maximum stroke of wheelhead, 9 in.; gap adjustment with standard bridge, 11¾—20¼ in.; distance from floor to center of chuck spindle, 48½ in.; hole through workhead spindle, 1 1/16 in.; power feed adjustment, 0.000138 to 0.0008 in.; main drive motor, 2 hp.; workhead motor, ⅔ hp.; wheelhead motor, 7½ hp.; net weight of machine, 16,000 lb.

Colonial High-Speed Horizontal Broach

Two flat surfaces are broached on more than 3,000 steel hydraulic brake couplings per hour in this special high-speed horizontal hydraulic broaching machine developed by Colonial Broach Co., Detroit, Mich. The machine is almost completely inclosed and is automatic in operation. The operator merely starts the machine and drops the parts into two loading apertures at the top of the machine. Finished parts are ejected into a basket. In this machine, the broaches are stationary, the work being pushed through them. There are two sets of broaches, permitting simultaneous broaching of two pieces on each stroke. The machine is rated at four tons capacity and has an 18-in. stroke. Standard hydraulic operating units are used, being driven by a 7½ hp. motor. Cycle is said to give a broaching speed of 45 ft. per min., with a return speed of 90 ft. per min.



Cleveland No. 80-D-66 Double-Crank Press

Having a capacity of 250 tons, the No. 80 D-66 straight-sided, double-crank press offered by the Cleveland Punch and Shear Works Co., 3900 St. Clair Ave., Cleveland, Ohio, is double back-geared and has a twin drive equipped with an electrically-controlled and hydraulically-operated friction clutch. All gears run in oil and there are no overhanging brackets in the rear. Press is designed with a box-type crown; the intermediate gearing and flywheel being mounted in this crown.

Slide of press is counterbalanced by air, the counter-balances being mounted in the uprights. Bed area is 42 in. front to back and 108 in. right to left. Stroke is 10 in. and the press operates at a rate of 15 strokes per min. Slide adjusting mechanism is power operated by an individual motor.

P & H Hansen 150-Amp. Vertical Welder

Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., offers the 150 amp. P & H Hansen vertical-type electric arc welder for a wide range of work in welding light gage

metals. Designed to occupy minimum floor space, this unit is claimed to have high current uniformity. Furnished with a.c. drive only, this welder is less than 4 ft. in height. It can be furnished with lifting ring and without wheels, where portability is not required.

Federal Offers Multi-Pin Clutch

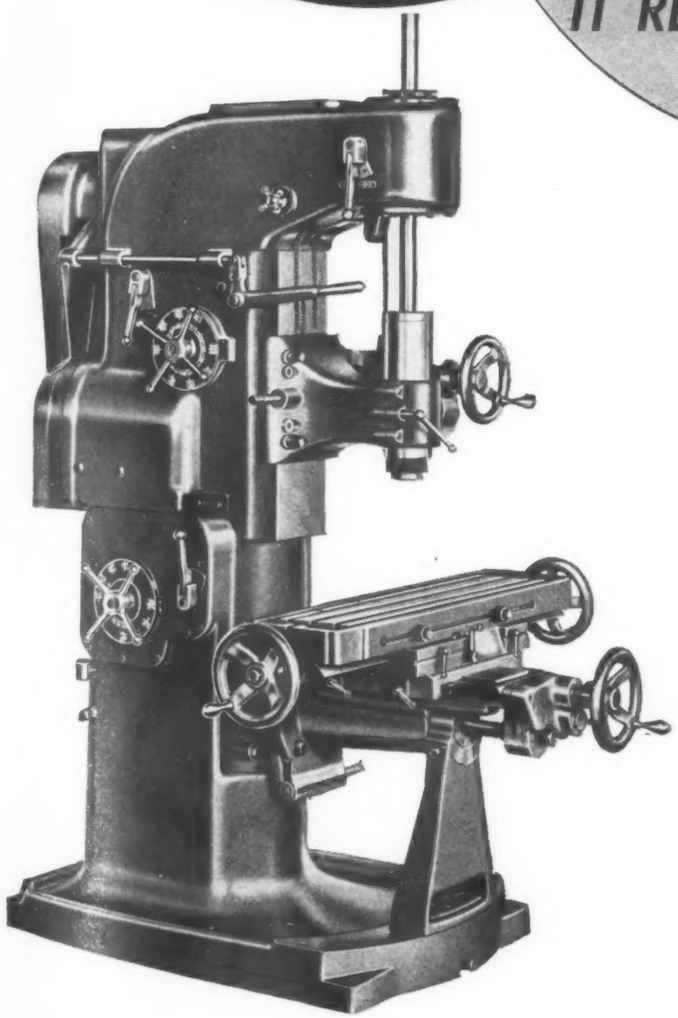
The Federal Press Co., Elkhart, Ind., has announced a multi-pin clutch which is available for all sizes of Federal presses. It is claimed that greater speed is obtained by the use of multiple pins mounted in the crankshaft that engage with a like number of openings in a hardened alloy steel plate attached to the flywheel. Pins are moved in and out of engagement by a cam, which is operated by contact with a shaft running horizontally toward the rear of the press. Incorporated in the clutch is a positive

THE BOSS SPEAKS . . .

"I SEE THIS JOB COSTS LESS THAN THE ESTIMATE"

THE SUPER ANSWERS . . . .

"YES THAT JOB WAS DONE ON OUR NEW KNIGHT-MILLER, IT REALLY PRODUCES"



• That, gentlemen, is the "Voice of Experience." Wherever these new Knight Millers are being used they are really producing.

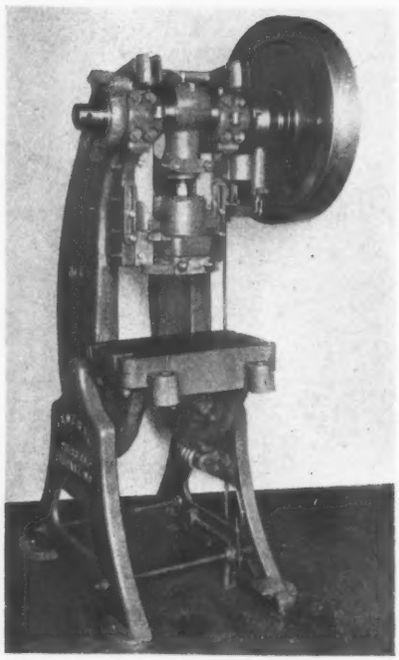
The tilting table, which also swivels around the Column and may be equipped with dial indicators, gives the Knight user the benefit of a built-in universal jig and fixture. This feature eliminates many hours of layout time—makes possible machining on different surfaces at one setting of the work, and saves the cost of much special equipment.

Higher speeds — greater power and accuracy, all of which are abundantly furnished in the new No. 40 and No. 30 Knight Millers go to make them real producers.

Write for details of what a Knight Miller will accomplish for you.

KNIGHT VERSATILE MILLERS ACCURATE - RIGID

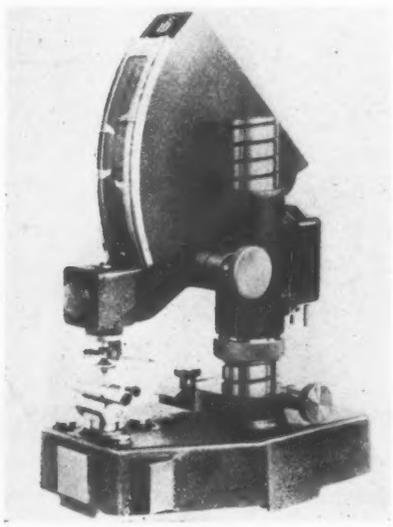
W. B. KNIGHT MACHINERY CO.
• ST. LOUIS, MISSOURI •



single stroke stripping mechanism which is engaged or disengaged easily for single or continuous operation. A safety device is provided which, when engaged, will hold the clutch out of operation while setting dies in the press.

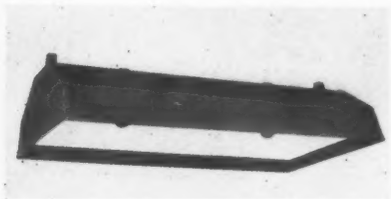
Werner "Microlux" Gaging Comparator

An improved Werner "Microlux" comparator has been offered by George Scherr Co., 128 Lafayette St., New York, N. Y. Amplifying mechanism now consists of three separate units; the pivoted lever, the spindle unit containing the measuring plunger, and the tilting mirror. Light source is located in the top of the housing, with vents for distribution of heat. Backstop is adjustable in vertical and horizontal plane. Measuring angle can be exchanged readily or replaced by special fixtures. This instrument has a 6-in. long scale with graduations in 0.001 in. Distance between graduations is 0.10 in. Total range of scale is 0.006 in., or a range of plus and minus from zero of 0.003 in.



Fostoria Type WC Canopy Localite

Well diffused, evenly distributed localized illumination is said to be provided by the WC canopy Localite offered by The Fostoria Pressed Steel Corp., Fostoria, Ohio. These



canopies have a minimum length of 5 ft. and can be made to the required length in multiples of 2½ ft. over the minimum. Over-all width is 36 in. and depth is 12½ in. One 150 or 200 watt clear lamp is required for each 2½ ft. of canopy length. Net weight is 57 lb. per 5 ft. of length.

Shore Model D Scleroscope

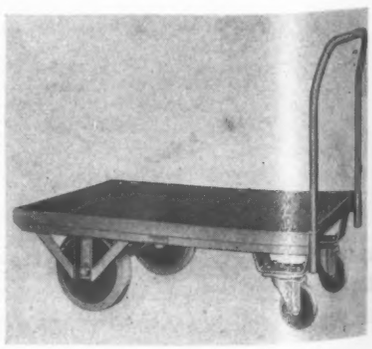
A pocket size indicating hardness tester has been developed by The Shore Instrument & Mfg. Co., Van Wyck Ave. & Carll St., Jamaica, N. Y. Listed as the Model D dial indicating scleroscope, this instrument is said to be designed so that it can be operated as readily as an automatic center punch. A diamond-pointed hammer is used, together with an improved clutch mechanism. With suitable attachments, tests can be made in a bench vise or on a surface plate as well as free-handed. Instrument weights 1-lb. and is 6-in. long.

Zenith Type P Process Timer

Two pointers connected with an electrical contact arm rides on each dial in the synchronous program clock and process timer developed by Zenith Electrical Co., 607 S. Dearborn St., Chicago, Ill. The standard model has one large 24-hr. dial and a 1-hr. dial cam. Segments are cut in the dials at the periods when the signal is to operate.

Lewis-Shepard Floor Truck

Capacities of this improved floor truck offered by Lewis-Shepard Co., 117 Walnut St., Watertown, Mass., range from 1,000 to 4,000 lb. These trucks have arc-welded frames with double side girders which hold



A STEP AHEAD IN CLUTCHES

THE *ONE CONTROL* POSITIVE JAW FEED CLUTCH

NO SLIPPING!

NO BINDING!

NO GROPING! for Controls

Positively POSITIVE.

POWERFULLY SO . . . . .

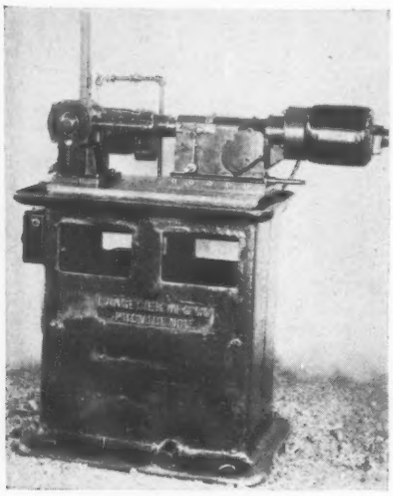
When LeBlond revolutionized apron operation by the positive jaw feed clutch — the big headache of friction feeds was cured. • This positively powerful — powerfully positive clutch spelled the end of slipping, binding — trouble-making friction feeds. It marked the beginning of a new ease in lathe operation — new precision — new power — no more spoiled work or wrecked machines. • And just one lever controls this smooth, constant, powerful feed — both longitudinal and cross — just one lever — which also releases the apron gears when engaging the lead screw. In addition, an automatic stop provides full protection to the lathe. • Simple—Positive—Powerful—the positive jaw feed clutch is one among many features that assure outstanding performance — in Lathes by LeBlond

ONE OF THE MANY "*Step Ahead*" FEATURES FOUND IN LATHES by LE BLOND

LEBLOND

THE R. K. LeBLOND MACHINE TOOL CO.
DEPT. H-8 **CINCINNATI, OHIO**

the hardwood top in place. Axles are reinforced by means of a tubular axle housing and are easily removable. Hyatt roller bearings are used in all wheels. Platform size ranges from 24 x 48 in. to 36 x 72 in. and weight ranges from 153 to 317 lb.

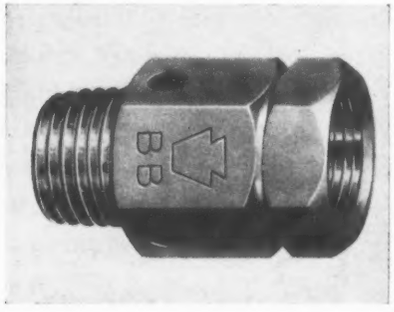


Langelier 2-Spindle Automatic Spotter

Developed especially for spotting two holes in the oscillating cutter of an electric razor, this horizontal two-spindle automatic machine offered by Langelier Mfg. Co., Providence, R. I., consists of a standard No. 11 positive cam-feed motor driven unit equipped with a two-spindle multiple head. This unit also drives the indexing mechanism, which is fed from a magazine. A motor driven pump is mounted in the cabinet base to supply coolant to the drills. Machine cycle is timed for a production of 1,800 pieces per hr. Floor space required by this machine is 22 x 32 in.

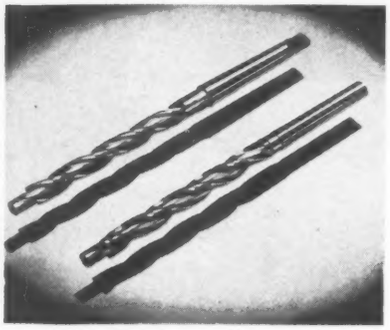
Keystone BB Lubrication Fitting

Designed to control the introduction of lubricant to a bearing, the BB fitting announced by Keystone Lubricating Co., Philadelphia, Pa., permits a maximum pressure of 2½ oz. per sq. in. in the bearing proper. This fitting, which operates on the principle of molecular friction, forces the lubricant past a calibrated orifice in the base and out through relief ports at the side when the pressure at the bearing reaches the designed maximum. As soon as excess grease appears at these ports, it is a signal that the bearing is sufficiently lubricated.



Putnam Hi-Speed Counterbore

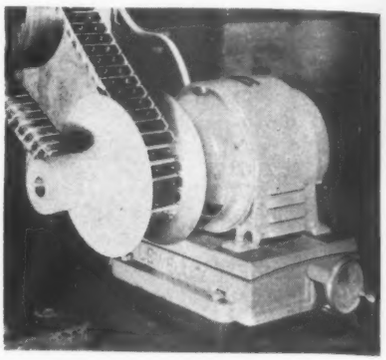
Made of high-speed steel and heat treated by the salt bath process, the "Hi-Speed" continuous-pilot counterbore offered by the Putnam Tool Co., 2981 Charlevoix Ave., Detroit, Mich., can be used for almost the entire length of the flutes before it becomes necessary to discard the tool. When the pilot head becomes too long, as the result of wear on the cutter flutes, it is cut off and the flutes are ground back to the length of a pilot head. This operation may be repeated as many as six times.



Van Dorn Small Die Grinders

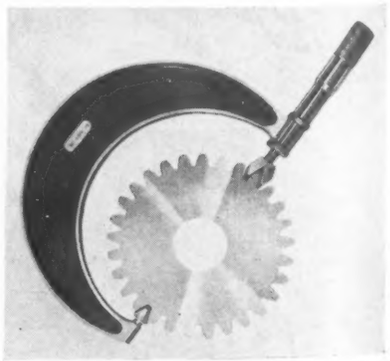
Two high-speed die grinders powered with universal motors which will operate on a.c. and d.c. have been announced by the Van Dorn Electric Tool Co., Towson, Md. Both of these grinders are equipped

with a ¼-in. single-purpose chuck which will accommodate wheels, pencil stones, rotary files and burrs. Spindle housings are of steel, with bearings mounted at extreme ends of the spindle to absorb radial load. The No. 7 grinder has capacity for a maximum wheel size of 2 x ½ x ½ in. Net weight is 2½ lb. This tool is 9 in. long over-all. The No. 12 grinder is 14½ in. long, weighs 4 lb. and will take a 2½ x ½ x ½ wheel. Both grinders have a no-load speed of 19,000 r.p.m. and a full load speed of 12,000 r.p.m.



Lewellen Pulley

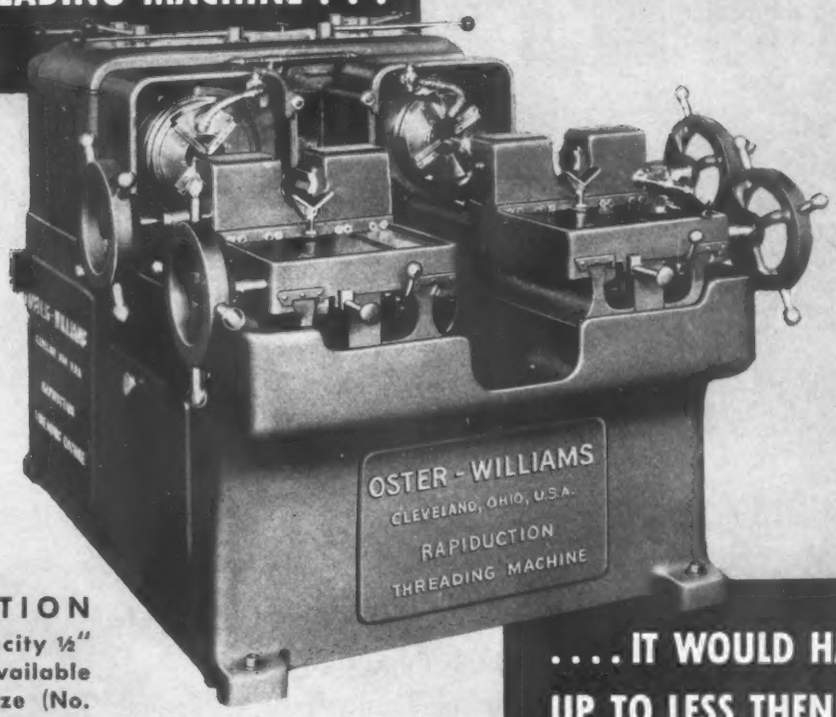
Designed to fit the shaft of a standard motor and drive directly to a pulley or sheave on the driven shaft, the variable-speed motor pulley offered by Lewellen Mfg. Co., Columbus, Ind., features positive, equalized disk travel in both directions. This is said to maintain the belt in the same position at all diameters. A uniform low spring pressure is maintained at all pulley diameters without buckling the belt. Pressure lubrication is provided for all bearing surfaces. All working parts, including the spring, are completely inclosed. The motor and pulley mount on an adjustable base, which permits infinite variation of the speed of the driven shaft.



Illinois Gear-Measuring Blocks

Made to the exact pitch and pressure angle of the gears to be measured, sets of measuring blocks offered by Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill., consist of three blocks, two males and one female. Two male blocks are used on gears

IF YOU HAD TOLD US IN ADVANCE EXACTLY WHAT YOU WANTED IN A HIGH-PRODUCTION BOLT-THREADING MACHINE . . .



RAPIDUCTION
No. 922—capacity ½" to 2¼"; also available in ⅜" to 1½" size (No. 915) both single and double spindle types.

. . . . IT WOULD HAVE ADDED UP TO LESS THEN WHAT THE RAPIDUCTION GIVES YOU

BEFORE STARTING to design the RAPIDUCTION, Oster-Williams engineers consulted shop men in a wide variety of plants to get their ideas as to what improvements they desired in bolt-threading equipment. Each one gave us things to think about but not one of them covered ALL the improvements that are combined in the RAPIDUCTION.

Today the combined results of that study plus the inventive talent of Oster-Williams engineers are being capitalized in a big way by Rapiduction owners. Users are unanimous in praising not only the high-speed precision operation of the machines but also the host of valuable "minor details" which make for greater production, lower upkeep and simplified control.

Threading Headquarters Since 1893

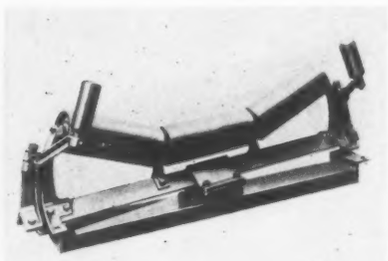
THE OSTER MANUFACTURING COMPANY

Sales Office: 2049 East 61st Street, Cleveland, Ohio
Factories: Erie, Pennsylvania and Cleveland, Ohio
New York City Showroom and Office, 292 Lafayette Street
Philadelphia Showroom and Office, 111 North 3rd Street

OSTER THREADING EQUIPMENT WILLIAMS

RAPIDUCTION BOLT-THREADING MACHINES

with an even number of teeth and the combination of one male and one female for gears with an odd number of teeth. These blocks are so designed that all points of contact between the block and tooth contour are located on the line of action, whether measuring a spur gear or helical gear. Blocks are made with large flat top surfaces to provide a solid seat for micrometer anvils, thus making it easy to secure a correct reading.

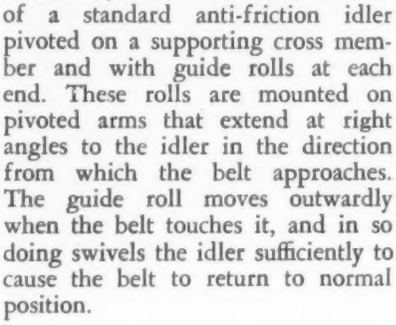


Jeffrey Belt Idler

A self-aligning idler for training conveyor belts automatically without damaging the belt has been announced by The Jeffrey Mfg. Co., Columbus, Ohio. This idler consists of a standard anti-friction idler pivoted on a supporting cross member and with guide rolls at each end. These rolls are mounted on pivoted arms that extend at right angles to the idler in the direction from which the belt approaches. The guide roll moves outwardly when the belt touches it, and in so doing swivels the idler sufficiently to cause the belt to return to normal position.

General "Dual K-10" Magnetic Valve

Two electrically independent solenoids operating two lever-action, high-pressure valves are built into the Dual K-10 magnetic valve for high-low fire or flow control, offered by General Controls Co., 450 E. Ohio St., Chicago, Ill. Lever action is claimed to develop six times the opening and closing power of straight magnetic valves. This unit will handle oils as heavy as No. 6 at usual room temperatures, or steam up to 125 lb. pressure with temperatures up to 400 deg. F. Flow adjustments are provided in both parts.



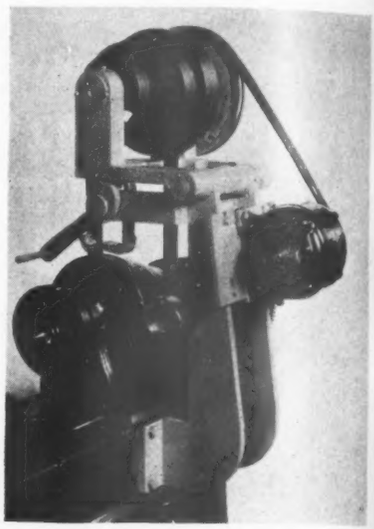
DeVilbiss Type QM Mixing Tank

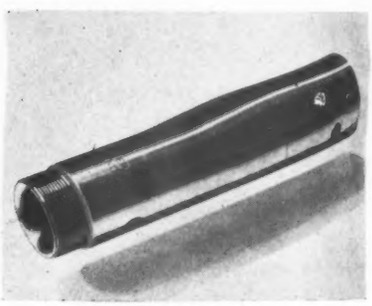
Available in 30, 60 and 120 gal. capacities, type QM hinged-lid mixing tanks offered by the DeVilbiss Co., Toledo, Ohio, are designed to facilitate agitation or mixing of lacquer, synthetic enamel or other pigmented finishing materials. This tank provides an inert atmosphere for mixing these materials, thereby preventing oxidation while handling. Clamps render the hinged portion pressure-tight. Each tank is equipped with an explosion-proof motor. Tanks may be interconnected to form a battery for use in paint circulating systems.

Wells Motor-Drive Unit

Three sizes of a motor drive unit have been developed by Wells Tool Co., 106 Hope St., Greenfield, Mass., to fit lathes from 12 to 20 in. swing. These drive units also can be adopted to such machines as millers, screw machines and turret lathes. Only four bolt holes are required in the machine base to attach this unit.

Drive from the motor to the cone shaft is by V-belts and sheaves. Cone shaft runs in ball bearings and the motor is mounted on an adjustable plate at the rear of the column. A handle on the unit permits raising it sufficiently to secure slack in the belt for easy speed changes. A single brake permits starting and stopping quickly.





Modern "No-Mar" Feed Finger

A non-scratch feed finger, offered by the Modern Collet & Machine Co., Ecorse, Mich., is said to be guaranteed against scratching the bar on which it is used. Listed as the "No-Mar" feed finger, this unit is particularly applicable where stainless steels and similar materials are being used, or when the metal is to be plated following the machining operations, and even slight scratches would become glaringly apparent.

Edelblute "Anchor" Wheel Puller

One size of the "Anchor" wheel puller offered by Edelblute Mfg. Co., Reynoldsville, Pa., is said to handle a wide range of jobs. The double-end chains have grab hooks at one end for spoked wheels and close-grip hooks on the other for use on solid wheels. On spoked wheels, the three chains are equally spaced and hooked around the

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Gears in stock!

AN you imagine that! More than one million gears all ready to be used by you; d, so that you can obtain them quickly, they are carried in stock in our own rehouses and distributors' stockrooms. Just phone, write or wire your require- nts to the one nearest you — and don't forget to ask them for a copy of our New neral Catalog #52 containing complete information on all Boston Power Trans- ssion Equipment. Here they are:

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Carey Machinery & Supply Co.

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Boston Gear Works, Inc.
Chandler & Farquhar Co., Inc.

BRIDGEPORT, CONNECTICUT
Hawley Hardware Company

BRONX, NEW YORK, N. Y.
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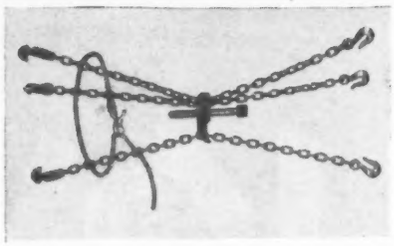
OSTON GEAR WORKS, INC. NORTH QUINCY, MASS.

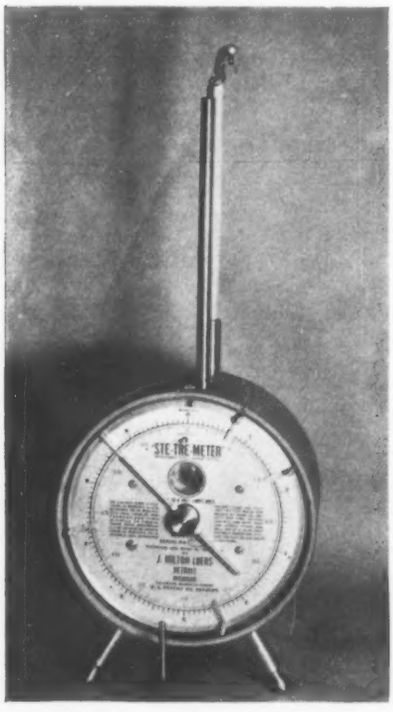


spokes, being set close to the hub. The point of the puller screw is held against the end of the shaft and each chain is drawn tight and slipped into a forked socket on the yoke. A binder rope is provided to hold the chains together during the pulling operation.

"Ste-Tre-Meter" Heating Timer

Having two time cycles of either 10 min. or 60 min., the "Ste-Tre-Meter" offered by J. Milton Luers, 3211 Bellevue Ave., Detroit, Mich., can be set to the proper heat-treating cycle time easily. When the pointer contacts a target, a red light is illuminated and the bell rings to warn the operator. As the pointer passes on it signals the operator at each succeeding target. A hand lever for returning the pointer to zero also serves as a carrying handle.

A ring for attaching the meter to the furnace returns the time pointer to zero when the furnace door is opened. Closing the door releases and starts the timer. Pointer may be moved by hand, and a foot lever is provided for returning the pointer to zero. The standard model is arranged for 110 volts, 60 cycle, single-phase a.c. service.



Willson Style WV-1 Spectacle Goggle

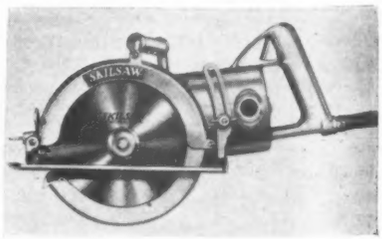
Designed for maximum protection and comfort, the style WV-1 spectacle-type goggle announced by Willson Products, Inc., 251 Thorn St., Reading, Pa., is equipped with "Super-Tough" lenses. It is available in various assemblies to suit individual requirements of the wearer. These goggles also are available with wire screen, leather or transparent sideshields, also with "Willsonite" lenses.

Chicago No. 92 Respirator

Offered for use in the lead dust generating trades such as storage battery manufacture, enameling, sand-papering, chipping painted surfaces, rubber compounding and other such operations, the No. 92 respirator developed by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago, Ill., also is suitable for protection against Type A dusts. Filler units have an effective breathing area of more than 45 sq. in. Face cushions are shaped to conform to facial contours and seal tightly without perceptible pressure.

Lyon Improved Foreman's Desk

An improved shop foreman's desk having a top section divided into one large and three small sections has been developed by Lyon Metal Products, Inc., Aurora, Ill. Drawer slides on roller bearings and is equipped with a flat key lock. Desk is 36 in. wide., 30 in. deep and 52 in. high over all. Height at front is 42 in.

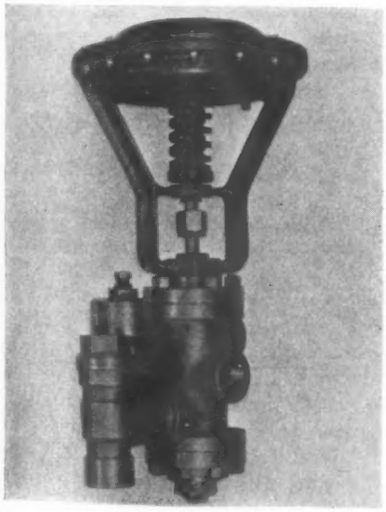


Skilsaw Model 87 Electric Saw

Model 87 portable electric hand saw offered by Skilsaw, Inc., 230 N. Michigan Ave., Chicago, Ill., has a 9-in. diameter blade and cuts to a depth of $2\frac{7}{8}$ in. It will cross cut 3-in. dressed lumber and bevel-cut $2\frac{3}{8}$-in. thick stock at 45 deg. Blade has a free speed of 3600 r.p.m. as standard, with an optional speed of 5,000 r.p.m. A spring-operated, telescopic guard protects the blade. This tool is 19-in. long.

Vandenwood Small Blueprinter

The "Baby Blue" portable blueprinting machine announced by Vandenwood Co., 3030 Euclid Ave., Cleveland, Ohio, is provided with a portable case which is complete with washing and fixing trays, fixing salts and a supply of ready cut 8½ x 11 in. sensitized paper. Maximum capacity of this machine is 9 x 18 in. prints.

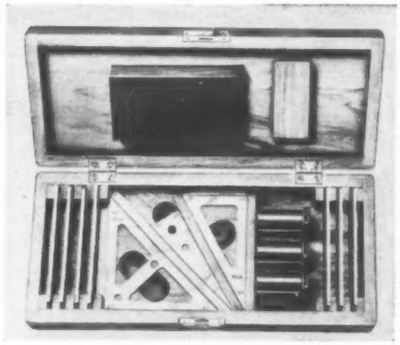


"Summit" Two-Pressure Operating Valve

Suited either to instantaneous manual or automatic cycle controlled operation, the "Summit" two-pressure hydraulic operating valve announced by Industrial Instrument Co., 96 E. Miller Ave., Akron, Ohio, has capacity for 3,500 lb. working pressure. Valve body and cast parts are made of hydraulic bronze alloy, while the seats and disks are of stainless alloy steel, heat-treated for maximum hardness and strength. This valve, being pneumatically operated, may be mounted where most convenient and may be controlled by a ¼-in. air valve or an automatic time-cycle controller.

T-P Universal Angle Gages

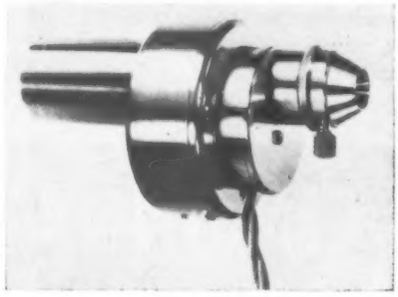
Said to produce accurately any angle between 0 and 180 deg. by 5 min. increments, this set of universal angle gages offered by Taft-Peirce Mfg. Co., 32 Mechanic Ave., Woonsocket, R. I., comprises 10 independent angle gages. Seven of these gages are parallel blades with



a pair of supplementary angles on each end; the other three gages are triangles. All gages are made of hardened tool steel and it is claimed that the variation from the exact angle of any combination will not exceed 1 min. The angle members are fixed in combination for convenient handling and use by a clamping device, three of which are provided in each set.

Smootharc "110" Welding Electrodes

Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., offers the Smootharc "110" welding electrode which has been developed specially for use in building up car wheels, rail ends and in flame hardening. Base metal of this electrode contains approximately one per cent carbon and the coating is designed to eliminate the brittleness common to high carbon deposits. It is claimed to be particularly suited for flame hardening gears fabricated by the welding process. In gears so made, the rim splices are made by arc welding and the weld metal, therefor, forms a part of the tooth section. If the carbon content were not high enough, the metal would not respond to the flame hardening treatment. Where no further treatment is given after welding, hardness will range from 20 to 40 Rockwell C, depending on the rate of cooling. In drastic quenching operations, such as in flame hardening, values run as high as 62 Rockwell C. Metal deposited by this electrode is not machinable.

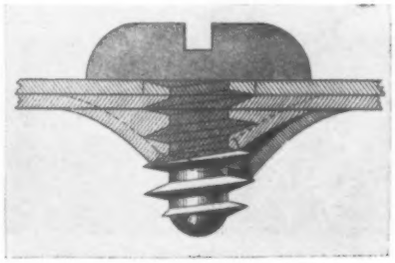


Bristol "Ardometer" Radiation Pyrometer

Using a temperature-sensitive unit, the Ardometer radiation pyrometer offered by The Bristol Co., S. Main St., Waterbury, Conn., measures the surface temperature of hot objects or masses above 1,000 F. when the unit is sighted so that it picks up the emitted heat rays. Temperature can be recorded on a recording potentiometer or indicated on a millivoltmeter pyrometer.

Prestole Sheet Fastening Method

A method of fastening into sheet metal, consisting of forming a conical protuberance by means of especially designed punches from one plane of metal, has been developed by Prestole Devices, Inc., 2679 E. Grand Blvd., Detroit, Mich. The apex of the conical protuberance presents a spiral surface equal to the pitch of the thread to the screw used. It is so constructed that the thread of the screw entirely overlaps the metal at the apex of the cone. Also incorporated into this protuberance is a slit allowing the

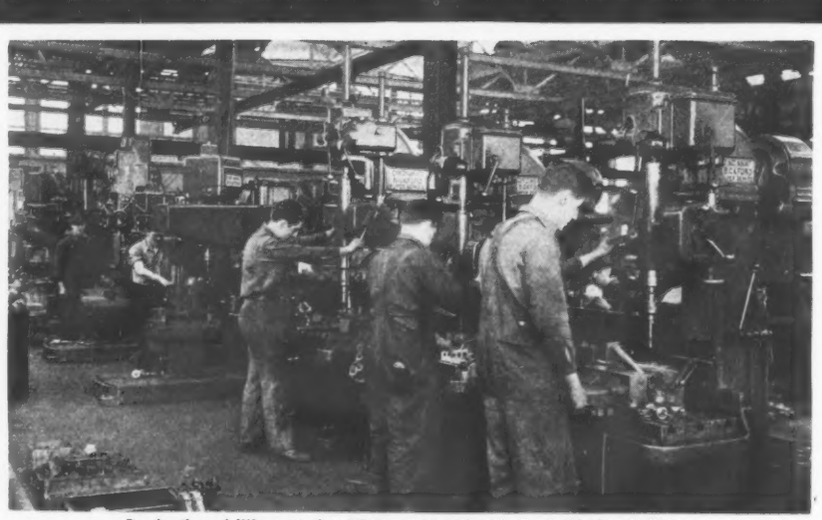


passage of the screw thread. Since the perforation through the metal is smaller than the root diameter of the screw, and the side walls of the protuberance present a concave-convex surface, it is claimed that considerable strength is obtained. This method is said to be practical in metals ranging from 0.015 to 0.062 in. thick and has been applied to automobile, refrigerator and stove assemblies. Die sets, including piercing punches, forming punches and dies, are available.

Bakelite Acetate Molding Plastics

Development of a line of acetate molding materials has been announced by Bakelite Corp., 247 Park Ave., New York, N. Y. These are thermoplastic molding compounds with a cellulose acetate base and are recommended for both injection and compression molding. They are offered in granular form in a wide range of colors, including crystal clear, black and variegated mottles. They also are available in transparent, translucent and opaque colors. These are custom-made materials and, therefore, molding properties and finished material properties can be altered to suit specific applications. Pieces produced from these materials are said to have a lustrous finish and to have unusual strength properties, being especially resistant to impact. Use is restricted only by the effect of heat and certain solvents. Tensile strength ranges from 3000 to 6500 lb. per sq.in., and transverse strength from 6000 to 7000 lb. per sq. in.

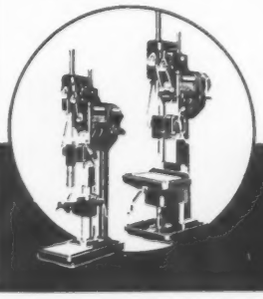
CINCINNATI BICKFORD



Production drilling at the Niagara Machine & Tool Works, Buffalo, N. Y., on 2-21" and 1-28" Super-Service Uprights. (Cincinnati Bickford Radial Drills in the background.)

All geared 21" 24" and 28"
SUPER SERVICE UPRIGHTS

Make YOUR production drilling more profitable



Niagara Machine & Tool Works is but one of many progressive plants getting "more holes per dollar" with Super-Service Uprights — modern, accurate machines developed from 63 years of specialized experience.

Among the features contributing to long life are: Automatic oiling, anti-friction bearings, heat-treated alloy steel parts, and complete enclosure. Profitable, fast, easier production is assured by convenient controls, automatic depth gauge and direct reading speed and feed plates.

Get all the details. Let us prove that you, too, can make your drilling operations more profitable.

The Cincinnati Bickford Tool Co.
Oakley, Cincinnati, Ohio

Azor "Bindedge" Gasket Edging

It is possible to make metal-reinforced gaskets on the job from any soft gasket material with "Bindedge," a channel-shaped, flexible strip of copper or other metal, offered by Azor Corp., Newark, N. J. This strip is available in 25 ft. coils and three sizes, for binding material from $\frac{1}{32}$ to $\frac{1}{4}$ in. thick. This strip has serrated edges and preformed teeth and is fitted around gasket openings after the gasket has been cut. It is claimed that no special tools or skill are required. The material is flexible and is readily formed around sharp corners and irregular outlines.

du Pont "Dulux" Short-Bake Enamel

Baking time of the "Dulux" enamel for industrial finishing offered by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., is 8-10 min. at 350 F. Short baking time permits greater output with smaller ovens. This finish is said to have satisfactory adhesion to metal and it may be applied on solvent cleaned, bonderited or primed steel. It shows hardness, mar resistance, flexibility and high resistance to grease, soap and alkali.

"Multi-Seal" Front-Drive Connector

Developed to provide a method of attaching pipe to containers without having to work on the inside, the "multi-seal" front-drive pipe connector offered by Multi-Seal Mfg. Corp., 123 N. Jefferson St., Chicago, Ill., regularly is available for $\frac{1}{8}$ to $\frac{3}{4}$ in. pipe sizes. Larger sizes can be made to suit requirements.

When inserting this connector, it is placed in the hole and the body held with a wrench while a second wrench tightens the nut. The compression cylinder located between the head of the pipe and the connector shank moves up on the shank taper, expanding and compressing to the inner surface of the job as the smallest, or active nut, is tightened.

Micro "Hydrion" pH Test Papers

Giving five color changes in the range of pH 2 to pH 10, Hydrion test papers distributed by R. P. Cargille, 118 Liberty St., New York, N. Y., can be used with turbid and highly colored solutions by observing the color of the outer diffusion zone on spot tests. These papers, manufactured by Micro Essential Laboratory, Brooklyn, N. Y., show a strong red color for a very strongly acid solution having a rating of pH 2; orange for a strongly acid solution of pH 4; yellow for a weakly acid solution of pH 6, a green color for weakly alkaline solutions of pH 8, and a dark blue color for strongly alkaline solutions of pH 10.

R. B. & W. "Empire" Recessed-Head Screws

"Empire" brand machine screws, stove bolts and sheet metal screws manufactured by Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., now are offered with Phillips recessed heads in a complete line of sizes. A license to manufacture these screws and bolts under the Phillips patents has been granted by the American Screw Co., Providence, R. I. These heads are claimed to have advantages in guarding work against slippage of the drive and permitting tighter fastening.

TRADE PUBLICATIONS

ANGLE VISE The Palmgren angle vise, available in six sizes, is described in a bulletin announced by Chicago Tool & Engineering Co., 839 S. Chicago Ave., Chicago, Ill.

BORING TOOLS Expanding block-type boring tools suitable for a wide range of applications are described in a 20-page Bulletin No. 300 published by Davis Boring Tool Div., Larkin Packer Co., Inc., 6200 Maple Ave., St. Louis, Mo.

CHUCKS A 1938 edition of Bulletin No. 51T, describing chucks for direct mounting on taper spindle noses, has been announced by the Skinner Chuck Co., New Britain, Conn.

COMPRESSORS Class WG-7 heavy-duty, single-stage horizontal compressors are described in Bulletin No. A-12-A offered by Sullivan Machinery Co., Woodland Ave., Michigan City, Ind.

CONTROLLER Bulletin No. 1173, offered by C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y., discusses the features of the "Celectray" throttling controller for electric furnaces and ovens. This controller is claimed to eliminate the need for rheostats, induction voltage regulators and similar equipment.

DRIVES A 4-page bulletin offered by the Congress Tool & Die Co.,

5 *out of* 10* *LEADING MAKERS of ELECTRIC METERS*

..... *use* **OAKITE** *Certified Cleaning*

5 out of 10 makers of electric meters rated AAAA in Thomas' Register*

Precision craftsmanship and precision cleaning go hand in hand. To make possible the delicate sensitivity and surprising accuracy of the modern instrument, a standard of production is called for which only precision methods of cleaning can meet.

For this reason it is significant that in such important operations as cleaning before plating and before finishing, Oakite materials and methods are now serving FIVE of the country's TEN leading makers of ammeters and voltmeters.

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Here's why . . . you will find, as have other industrial leaders, that by changing over to dependable Oakite cleaning, you will benefit by low cleaning cost, improved results, greater speed . . . and safety. Tell us your problems . . . we are anxious to help. Won't you write today?

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OAKITE *Certified* CLEANING

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Inc., 9030 Lumpkin Ave., Detroit Mich., describes F.H.P. pulleys and flexible couplings. This bulletin contains list prices and engineering data.

DRUM RACKS Bulletin No. 406, offered by Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill., discusses the features of an improved barrel and drum rack for industrial use.

DROP HAMMERS Bulletin No. 325 recently published by Erie Foundry Co., Erie, Pa., discusses the manufacture of steam and air drop hammers and honors a number of employees who have helped build this company's reputation during the 43 years of its existence.

DUST ARRESTER The Northern Blower Co., 6409 Barberton Ave., Cleveland, Ohio, is distributing a four-page bulletin No. 100-2, in which is described the "Norblo" screen-type dust arrester for industrial applications.

DUST COLLECTOR The Roto-Clone dynamic precipitator manufactured by American Air Filter Co., Inc., Louisville, Ky., is described in detail in Bulletin No. 272. This combined exhauster and dust separator is said to be particularly applicable for dust collection in grinding operations.

ELECTRIC TRUCKS Type F-8 tiering fork trucks and Type E-2 high-lift platform trucks are described in four-page bulletins offered by the Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.

ENGINEERED BORING "The Story of Engineered Boring in Picture Form" is the title of Bulletin No. 200 in which are shown a number of special boring tools developed by Davis Boring Tool Div., Larkin Packer Co., Inc., 6200 Maple Ave., St. Louis, Mo.

FANS A 24-page, pocket-size catalog featuring a full line of fans and air circulators is being distributed by the Emerson Electric Mfg. Co., St. Louis, Mo.

FLY CUTTERS Bulletin No. 200 offered by Davis Boring Tool Div., Larkin Packer Co., 6200 Maple Ave., St. Louis, Mo., discusses the features of a single-point boring tool which adjusts accurately to 0.00025 in. on the diameter.

FORGING PRESSES Features of solid-frame forging presses available in 500-2000 ton capacity are fully described in Bulletin No. 75 offered by the Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio.

GRINDER A wide variety of internal and external work can be done on the No. 112 universal precision grinder offered by Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass. and described in Bulletin No. 112B. Attachments make this machine effective on a wide variety of work.

GALVANIZING Equipment and supplies for electro-galvanizing are fully described in a 32-page bulletin offered by The Meaker Co., 1615 So. 55th Ave., Chicago, Ill.

HAND MILLERS The No. 1 "Bristol" and the No. 2 heavy-duty hand milling machines offered by The Producto Machine Co., Bridgeport, Conn., are fully described in an eight-page circular, No. 101, recently published. Attachments for these machines also are described.

HAND TRUCKS The Fairbanks Co., 393 Lafayette St., New York, N. Y., has announced publication of a 24-page catalog, No. 51-32, in which are described a number of hand trucks of standard and special de-

PRECISION PAYS

An unusual industrial occurrence perhaps, but an important one in which all dies on production runs were remounted in Danly Precision Sets.

In modern high-speed production, precision pays and Danly Precision Die Sets are money makers on the press line—in their freedom from shearing and the consequent need for regrinding, and the guarantee against production line tie-ups and die destruction.

Precision Pays—Protect your dies by specifying Danly Precision Die Sets.

DANLY DIE SETS AND DIE MAKERS' SUPPLIES FROM THE 8 DANLY BRANCH OFFICE STOCKS

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DAYTON, OHIO . . . 990 E. MONUMENT AVENUE
PHILADELPHIA, PA. . . . . 3913 N. BROAD STREET
ROCHESTER, N. Y. . . . . 16 COMMERCIAL STREET
MILWAUKEE, WIS., 513 EAST BUFFALO STREET

DANLY MACHINE SPECIALTIES, Inc., 2110 So. 52nd Ave., Chicago, Ill.

DANLY PRECISION DIE SETS

sign for various purposes. This catalog is fully illustrated and dimensions of standard trucks are tabulated.

HEATING ELEMENTS Useful data on life expectancy of electrical heating alloys is contained in a reprint of a paper prepared by Francis E. Bash, manager of the technical department, Driver-Harris Co., Harrison, N. J. The title of this reprint is "Estimating Life of Electrical Elements."

HOT TINNING Bulletin No. 7, Series B, published by The International Tin Research and Development Council, 149 Broadway, New York, N. Y., is entitled "The Hot-Tinning of Fabricated Articles" and has been prepared by E. J. Daniels. This booklet outlines practical methods employed in tinning metal articles of all descriptions.

INSTRUMENTS A 20-page booklet, entitled "Socket Instruments," offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discusses installations, applications and economies of plug-in instruments. Ask for Bulletin No. B-2136.

LIGHTNING "Stop Lightning's Costly Raids" is the title of a 12-page booklet, No. B-2125, announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Features of CSP transformers are discussed.

MACHINE DRIVES Two bulletins discussing the features of modern machine tool drives have just been published by Cullman Wheel Co., 1349 Altgeld St., Chicago, Ill. These drives are suitable for motorizing lathes, milling machines, punch presses and other machine tools.

METAL HOSE "Avioflex" hose for oil connections which utilizes a multiple cellulose sheet steel over a flexible metal core is described in a four-page bulletin offered by Chicago Metal Hose Corp., Maywood, Ill.

NEEDLE BEARINGS Bulletin No. 962, offered by Norma-Hoffmann Bearings Corp., Stamford, Conn., describes precision needle roller bearings and needle rollers. Sizes and load ratings are tabulated.

PLASTICS A 16-page booklet entitled "The Versatile Service of Bakelite Plastics" has been published by Bakelite Corp., 247 Park Ave., New York, N. Y.

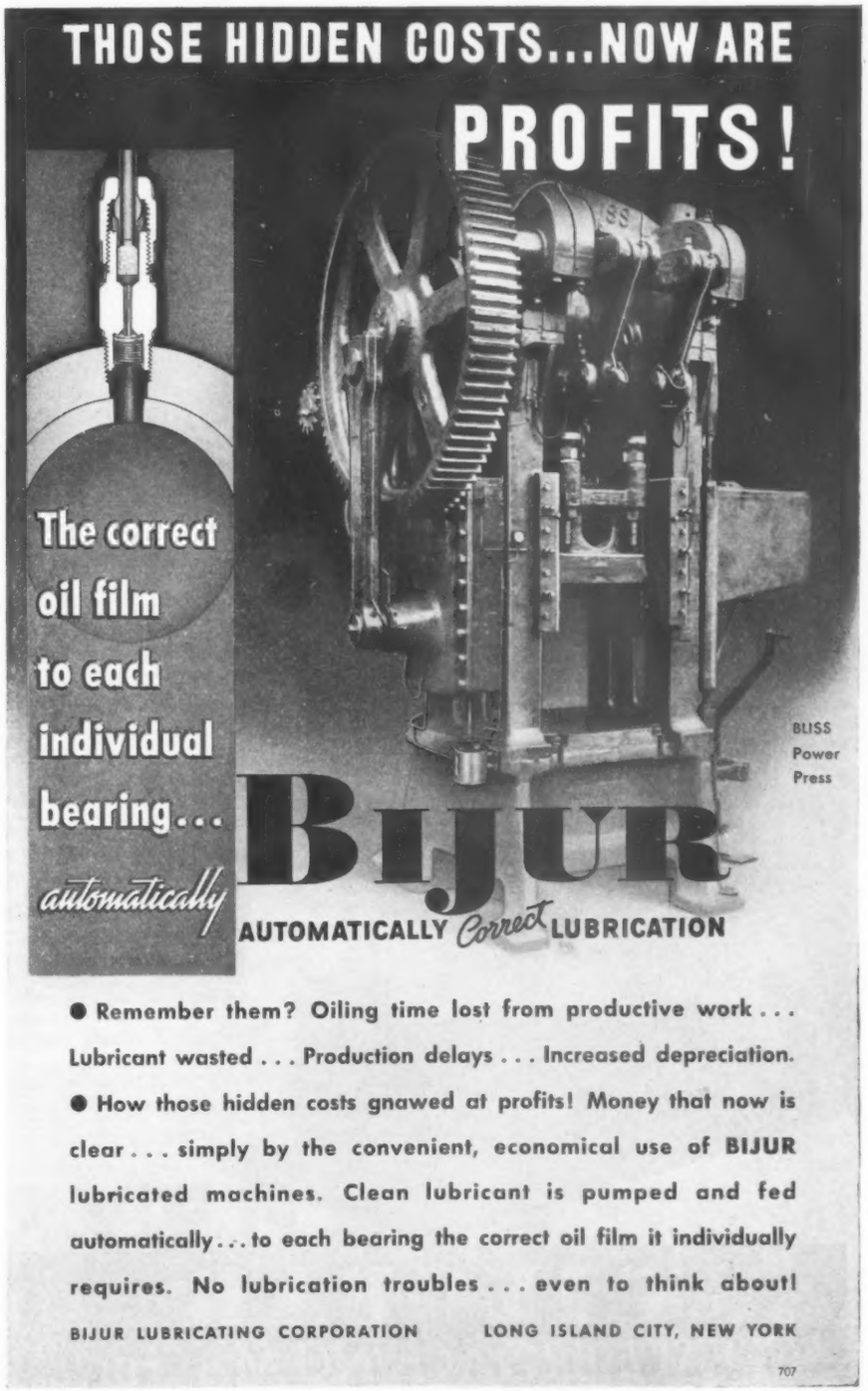
PORTABLE TOOLS A complete line of Thor portable electric tools is described in a 48-page catalog issued by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. Also shown are a wide variety of attachments available for use with Thor screwdrivers and nut setters.

POTENTIOMETER Bulletin No. 507 offered by The Bristol Co., Waterbury, Conn., discusses "Pyromaster" round-chart potentiometers.

PYROMETERS Bulletin No. 488, offered by The Bristol Co., Waterbury, Conn., discusses the construction and operation of millivoltmeter pyrometers, available in a number of models.

REMOTE CONTROL A description of the "Metameter" system for telemetering and remote automatic control is included in Bulletin No. 506 now being distributed by The Bristol Co., Waterbury, Conn., Photographs and chart records are used to il- in an exceptionally interesting manner.

RESPIRATOR Air line respirators and attachments are described in Bulletin No. CS-6 offered by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.


THOSE HIDDEN COSTS...NOW ARE
PROFITS!
The correct oil film to each individual bearing... automatically
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AUTOMATICALLY Correct LUBRICATION
● Remember them? Oiling time lost from productive work . . . Lubricant wasted . . . Production delays . . . Increased depreciation.
● How those hidden costs gnawed at profits! Money that now is clear . . . simply by the convenient, economical use of BIJUR lubricated machines. Clean lubricant is pumped and fed automatically . . . to each bearing the correct oil film it individually requires. No lubrication troubles . . . even to think about!
BIJUR LUBRICATING CORPORATION LONG ISLAND CITY, NEW YORK
707

SEPARATORS Catalog No. 770 offered by Dings Magnetic Separator Co., Milwaukee, Wis., discusses the features of Type IR high-intensity induction magnetic separators and Type E "Rowand-Wetherill" cross-belt machines.

SHEARS Series K squaring shears in capacities up to ½-in. are described in bulletin K offered by Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y. A condensed summary of the features of these shears is included.

SOLDER "Frostiness in Plumbers' Solder" is the title of Bulletin No. 73, Series A, offered by the International Tin Research and Development Council, 149 Broadway, New York, N. Y.

STEEL DATA "High Temperature Characteristics of Steels as Revealed by the Stress-Rupture Test" is the title of Technical Bulletin No. 21 offered by The Steel and Tube Division, Timken Roller Bearing Co., Canton, Ohio. This bulletin is an authorized reprint of a paper presented by A. E. White and C. L. Clark of the Department of Engineering Research of the University of Michigan, and W. G. Hildorf, chief metallurgist of the Timken Roller Bearing Company. Diagrams, tables and photomicrographs are included.

STAINLESS STEEL An 8-page booklet published by the American Rolling Mill Co., Middletown, Ohio, gives a brief account of the history of stainless steel and other information of value to the user and seller of stainless equipment.

STEELS General Catalog No. 5, a 120-page booklet offered by Jessop Steel Co., Washington, Pa., discusses the properties and uses of a wide range of steel products. Machining, heat-treating and application data are given for each different steel.

STEEL WHEELS Wrought steel wheels for railway, mine car and crane service are briefly described in Section 20 of the Steel Products Manual published by the American Iron and Steel Institute. This 14-page pamphlet also defines technical terms relating to the heat-treatment and machine finishing of these wheels. Price, 15 cents per copy.

TRACK MATERIALS Definitions and descriptions of railway track materials are set forth in Section No. 19 of a projected steel products manual recently issued by the American Iron and Steel Institute, 350 Fifth Ave., New York, N. Y. This 16-page bulletin illustrates standard types of T-rails, joint bars, tie plates, track bolts and track spikes. Price, 15 cents per copy.

TRANSFORMERS Bulletin No. B-2138 offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discusses the features of Type FW current transformers for instrument applications.

NEW BOOKS

ADVERTISING AND SELLING THROUGH BUSINESS PUBLICATIONS. *By Mabel Potter Hanford. Published by Harper Bros., 49 E. 33rd St., New York, N. Y. Price,* $2.50.

Planned as a textbook of value to publishers, advertisers and students interested in business publications, and concerned with establishing business paper advertising and publishing on a sound and effective basis, this book lists 25 questions which the advertiser and space buyer

for Results—

GENUINE OILGEAR

SURFACE BROACHING MACHINES

● To men familiar with the Oilgear Variable Delivery Pump—with the inherent advantages it offers over its many imitations, the application of that completely controllable and dependable flexible power unit to Surface Broaching needs can mean only one thing. Oilgear Surface Broaching Machines offer a smoothness of operation and dependable performance beyond comparison. For high production at close tolerances, with almost negligible maintenance, experienced shops insist on Oilgear. For full description of these remarkable Oilgear Surface Broaching Machines, write for Bulletin 23,000A. THE OILGEAR COMPANY, 1301 West Bruce Street, Milwaukee, Wisconsin.

- One or more pieces finish-broached simultaneously
- Highest production at close tolerances
- Each unit complete and self-contained
- Single lever, semi-automatic control
- Automatic full interlock of broach and shuttle tables
- Welded all-steel construction
- 6, 10, 16, 20 ton capacities

OILGEAR

SURFACE BROACHING MACHINES

might well ask the space salesman about the editor of his publication. Advertising copy may be a costly item in preparation, but Mrs. Hanford claims that "the advertising page is so much a part of the business publication that only when its message speaks the language of the magazine's audience will it perform the kind of sales function that makes advertising a profitable branch of the sales department."

Included in the book is a comprehensive bibliography of sources of market statistics, together with the findings of a far-reaching survey of reader habits conducted by Crossley, Inc., for the McGraw-Hill Publishing Company in 1937, and here published for the first time. The editorial story and the responsibility of the man who occupies the editorial chair to his reader and to the advertiser receives much attention in the chapter on "Editorial Standards." Mrs. Hanford reports that the business paper representative is becoming more and more conscious of the importance of the man behind his publication.

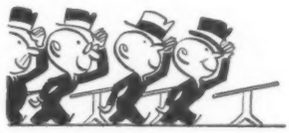
TALKING SHOP

Copper Plus Nickel

Traveling about from one plant to another we note that there has been an increase in the use of nickel plate as a protective coating for selective heat treating. It has particular advantages in nitriding where it was found that tin plate which melts at about 975 deg. ran off the pieces and ruined the nitriding pot. The nickel also gives a dense surface which the nitrogen cannot penetrate. One company which makes many small parts found that an undercoat of 0.0003 to 0.0005 in. of copper with a covering of 0.0001 to 0.0002 in. of nickel gave much more positive protection in nitriding operations than a copper coat alone.

Drafting Room Oddities

Drafting room procedure is a long way from being standardized, as the following incidents will prove. The first incident involves observation of working hours. We had been discussing various matters of interest with a department chief in a very well-lighted and managed drafting room when twelve o'clock struck and immediately all the lights went out. "Let's go to lunch," said the official. "The lights won't come on again until 1 o'clock."



We expressed some surprise at this procedure and he went on to say that the same rigid observation of quitting time is enforced. Men in that drafting room are expected to work hard and efficiently during working hours and to put in no overtime.

While we were being shown through an even larger drafting department of another company, we looked in at the door of a drafting room where some 25 tracers were at work, all of them women. The chief draftsman told us that this department had been in operation for a long time with only women tracers and that it was one of the

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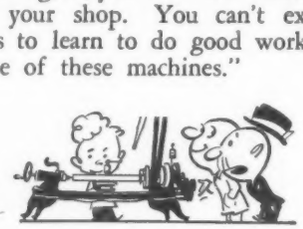
most efficient in the division. He said that the experience had been that the women were more careful and that they were not ambitious to become chief engineers or chief draftsmen of the corporation within a few months.

Old and New Machines in the School Shop

A visitor was criticizing the equipment of a trade school some years ago. "I'm surprised," he said to the director, "that the school board didn't give you all new machines for your shop. You can't expect boys to learn to do good work on some of these machines."



"Don't blame the school board about these machines," said the director. "I picked 'em myself. And I'll tell you why. I like nice new machines as well as anyone. But I figure that if my boys have only first class machine tools to learn on they'll be lost when they go out into the average shop.

"Suppose I sent a boy to your shop and the foreman put him to work on that old Lodge and Barker lathe I saw there the last time I was in. The firm has been out of business about forty years. He'd have to learn a lot of things before he'd produce much. That's why I picked a few old machines. They not only appreciate the new ones but they won't be stuck, even in your shop."

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Heavy Fixtures Pay

In manufacturing engine parts a certain company found it desirable to use very heavy jigs and fixtures when the quality being produced was great enough to reduce handling of fixtures to a minimum. All milling and planing operations on transmission cases and cylinder blocks, for example, are done while holding the parts in comparatively heavy cast iron fixtures. The results are a reduction in vibration and chatter with an increase in accuracy that is surprising. Much longer tool life with consequent reduction of overall operation time, however, is the real plus dividend that makes the extra expense of an extra heavy jig worthwhile.

Ten Thousand Words

"One picture is as ten thousand words," says an old Chinese proverb and a certain production man that we know. In recent modernization work in his plant some machines which were in good shape had to be scrapped. He contacted various possible users of this machinery by mail with no results. He then took photographs of the machines some of which showed them working on certain jobs. These photographs were mailed out with only a brief note indicating that this machine was for sale and within two days it was sold at a good price.

His hobby for photography has served the company in other cases. He showed us a picture of parts of machinery which had failed. Upon presentation of the location and type of failure by one photograph much argument and delay in settlement of damages was avoided.

The same idea was used in forging and casting failures. The pictures served not only as visual evidence of

such defects but also indicated possible changes in design or foundry practice when the accumulated evidence showed that such failures occurred again and again in the same section. Failures in gears due to errors in design, machine practice and use of radii were eliminated after sufficient recorded visual evidence was accumulated to show recurring similar breakdowns.

In the manufacture of its engines this company desired to maintain a certain uniformity in the shaping of the fuel line and other piping. After several attempts it was found that the simplest way to convey the necessary information to the new men was by photographs of each engine with properly installed piping.

Better Thermal Efficiency

Detailed report of development by German engineers in the use of the absorption type of refrigerating unit has been received by the Machinery Division, Bureau of Foreign and Domestic Commerce. The Germans have succeeded in improving the thermal efficiency of this type of machine, and increasing its economic efficiency. Absorption type refrigerators have been used of late for the production of dry ice.

PATENTS

April 19, 1938

Metal-Working Machinery

Broaching Apparatus. Emil A. Baumbach, Chicago, Ill. Patent 2,114,276.

Edge Rounding Machine. Thomas S. Riley, Philadelphia, Pa. Patent 2,114,318.

Grinding Machine. Victor W. Gideon, Chicago, Ill., assigned to Boyar-Schultz Corp., Chicago, Ill. Patent 2,114,343.

Honing Machine. Albert M. Johnson, Rockford, Ill., assigned to Barnes Drill Co., Rockford, Ill. Patent 2,114,349.

Annealing Furnace and Method of Annealing. Edward I. Huff, Pittsburgh, Pa. Patent 2,114,382.

Grinding Machine. Henry J. Perazzoli, Philadelphia, Pa. Patent 2,114,454.

Gear Lapping Machine. William E. Sykes, Buffalo, N. Y. Patent 2,114,616.

Machine for Producing Gears. Leonard O. Carlsen, Rochester, N. Y., assigned to Gleason Works, Rochester, N. Y. Patent 2,114,627.

Machine for Generating Tapered Gears. William E. Sykes, Buffalo, N. Y. Patent 2,114,690.

Washing and Drying Machine. George Webb, West Hartford, Conn., assigned to Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. Patent 2,114,893.

Parts and Mechanisms

Machine Tool Structure with Feeding Apparatus. Edward Joslin Kingsbury, Keene, N. H. Patent 2,114,389.

Power Transmission. George A. Foisy, New Haven, Conn., assigned to The Waterbury Tool Co., Waterbury, Conn. Patent 2,114,443.

Power Transmission. Henry G. Gros, Oakville, Conn., assigned to The Waterbury Tool Co., Waterbury, Conn. Patent 2,114,445.

Shaft Sealing Device. Lowell Hobart Grisell, Highland Park, Mich. Patent 2,114,489.

Rivet and Rivet Setting. Louis C. Huck, Grosse Pointe Village, Mich., assigned to Huxon Holding Corp., Detroit, Mich. Patent 2,114,493.

Protected Screw Take-Up. Richard F. Bergmann, La Grange, Ill., assigned to Link-Belt Co., Chicago, Ill. Patent 2,114,555.

Method and Apparatus for Threading Pieces. Earl W. Brinkman, Rochester, N. Y., assigned to Davenport Machine Tool Co., Inc., Rochester, N. Y. Patent 2,114,626.

Pillow Block. Raymond R. Searles, New Britain, Conn., assigned to The Fafnir Bearing Co., New Britain, Conn. Patent 2,114,670.

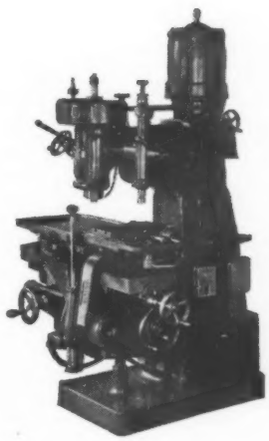
Curved Tooth for Bevel Gear Wheels. Walther Bauersfeld, Jena, Germany, assigned to Carl Zeiss, Jena, Germany. Patent 2,114,793.

Antifriction Bearing Center for Boring Mills. John Burt, Narberth, Pa., assigned to William Sellers & Co., Inc., Philadelphia, Pa. Patent 2,114,911.

Processes

Method of Making Propellor Blades. Frank W. Caldwell, Hartford, Conn., assigned to United Aircraft Corp. of Delaware. Patent 2,114,414.

Method of and Apparatus for Making Rivets and the Like. Roy J. Freter, Waterbury, Conn., assigned to The E. J. Manville Machine Co., Waterbury, Conn. Patent 2,114,420.



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Tools and Accessories

Adjustable Boring Bar. Frederick Charles Jearum, Chipstead, England. Patent 2,114,384.

Tap. Oscar E. Koehler and Earl R. Koonz, Greenfield, Mass., assigned to Greenfield Tap & Die Corp., Greenfield, Mass. Patent 2,114,448.

Rivet Set Retaining Collar. Joseph Penglase, Rogers City, Mich. Patent 2,114,504.

Mechanism for Fashioning Hollow Bodies. Byron Franghia, Paris, France, assigned to British Hygienic Containers Ltd., London, England. Patent 2,114,596.

Broach. Wilrose J. Phaneuf, Hudson, Mass., assigned to The Lapointe Machine Tool Co., Hudson, Mass. Patent 2,114,607.

Bench Vise. Hans Olsen, Everett, Wash. Patent 2,114,637.

Pin Cutter. Clinton W. Kneff, Bridgeville, Pa. Patent 2,114,926.

Thread Gauge Adapter for Micrometers. Jacob Pilnick, Cleveland, Ohio. Patent 2,114,936.

Apparatus for Cold Rolling Axle Journals. Oscar J. Horger and Harry R. Neifert, Canton, Ohio, assigned to The Timken Roller Bearing Co., Canton, Ohio. Patent 2,114,978 and 2,114,979.

April 26, 1938

Metal-Working Machinery

Filing Machine. Arthur J. Brickner, Muskegon Heights, Mich., assigned to Brickner Kropf Machine Co., Muskegon Heights, Mich. Patent 2,114,994.

Milling Machine. Joseph V. Armitage, Wauwatosa, Wis., assigned to Kearney & Trecker Corp., West Allis, Wis. Patent 2,115,058.

Electric Welding Apparatus. Edward J. Podany, Detroit, Mich., assigned to The Murray Corp. of America. Patent 2,115,084.

Broaching Machine. George F. Yager, Toledo, Ohio, assigned to The Bunting Brass & Bronze Co., Toledo. Patent 2,115,186.

Multiple Spout Press for Plastic Material. George K. Bainbridge, Ripon, Calif. Patent 2,115,246.

Nut Tapper. Frank H. Awig, Cleveland, Ohio. Patent 2,115,452.

Polishing Machine. Edmund Hartmann, Dessau, Germany, assigned to Junkers Flugzeug-und-Motorenwerke Aktiengesellschaft, Dessau, Germany. Patent 2,115,461.

Straightening Machine. Bertis H. Urschel, Bowling Green, Ohio. Patent 2,115,474.

Molding Machine (Plastic). Charles Daniel Ryder, Covington, Ky., assigned to The Grotelite Co., Bellevue, Ky. Patent 2,115,590.

Nut Threading Machine. Joseph Werner, Detroit, Mich., and George Kroupsky, New York, N. Y., assigned to The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Patent 2,115,599.

Nut Threading Machine. Richard L. Wilcox, Waterbury, Conn., Joseph Werner, Detroit, Mich., and George Kroupsky, Amityville, N. Y., assigned to The Waterbury Farrel Foundry & Machine Co., Waterburg, Conn. Patent 2,115,604.

Grinding Machine. Albert G. Belden, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,115,678.

Parts and Mechanisms

Work Supporting Roll for Polishing Machines. Alfred J. Sandorff, Niagara Falls, N. Y., assigned to General Abrasive Co., Inc. Patent 2,115,217.

Machine Tool (Grinder Spindle). Millard Romaine and Walter D. Archea, Cincinnati, Ohio, assigned to Cincinnati Grinders Inc., Cincinnati, Ohio. Patent 2,115,236.

Indexing Mechanism. Robert H. Pratt, Milwaukee, Wis., assigned to Oak Mfg. Co., Chicago, Ill. Patent 2,115,284.

Rotary Radial Plunger Hydraulic Apparatus. Elek K. Benedek, Bucyrus, Ohio. Patent 2,115,296.

Frictional Transmission Gearing. Frantisek Götz, Prague-Smichov, Czechoslovakia, assigned to Limited Co., Plzen, Prague, Czechoslovakia. Patent 2,115,[illegible].

Processes

Production of Highly Elastic Flexible Tubes or Diaphragms. Albert Dreyer, Lucerne, Switzerland, assigned to Chicago Metal Hose Corp., Maywood, Ill. Patent 2,115,419.

Tools and Accessories

Abrasive Wheel and Method of Using Same. David E. Mulholland, Niagara Falls, N. Y., and Walter S. Mulholland, Upper Montclair, N. J., assigned to General Abrasive Co., Inc. Patent 2,115,209.

Abrasive Wheel. David E. Mulholland, Niagara Falls, N. Y., assigned to General Abrasive Co., Inc. Patent 2,115,210.

Expanding Tool. George D. Buck, St. Louis, Mo. Patent 2,115,251.

Boring Tool. Richard T. Roye, Houston, Tex., assigned to Gray Tool Co., Houston, Tex. Patent 2,115,319.

Photoelectric Safety Guard (Presses). Clarence P. Wood, New York, N. Y., assigned to Polymet Mfg. Corp., New York, N. Y. Patent 2,115,322.

Continuous Gauge Head. Spencer B. Terry, West Hartford, and Raymond S. Fox, Hartford, Conn., assigned to Niles-Bement-Pond Co., Hartford, Conn. Patent 2,115,351.

Collapsible Tap for Pipe Couplings. William J. Hogg, Cleveland, Ohio, assigned to The National Acme Co., Cleveland, Ohio. Patent 2,115,365.

Header Box Facing Tool. Thomas E. Schley, John R. Chenall, and Eddie R. Kehrer, Beaumont, Tex., assigned to Socony-Vacuum Oil Co., Inc. Patent 2,115,430.

Abrasive Wheel Mount. Thure Larsson, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,115,683.

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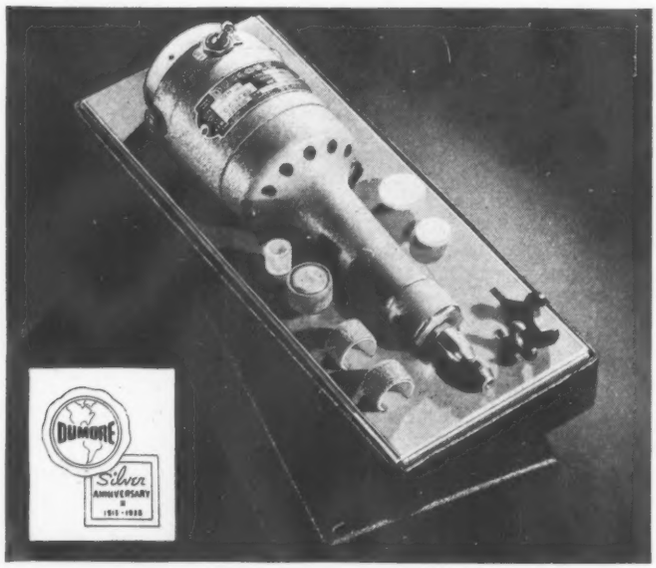

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ROCHESTER, N. Y.—Erskine-Healy
ROCKFORD, ILL.—Mid-States Industrial Corp.
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